NOTE

This Microfiche meets the quality requirements of the American National Standard for Microfiche of Documents (ANSI PH5.9-1975). However, because of imperfections in the document from which it was made, it contains images that are illegible or difficult to read. The source document for this microfiche is the best copy that could be obtained prior to filming.

CIS

Congressional Information Service, Inc
Washington D.C

S. Hrg. 101-812

HARD ROCK MINING

HEARING

BEFORE THE

SUBCOMMITTEE ON MINERAL RESOURCES
DEVELOPMENT AND PRODUCTION

OF THE

COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

ONE HUNDRED FIRST CONGRESS

SECOND SESSION

ON THE

RECLAMATION AND BONDING PRACTICES ASSOCIATED WITH HARD ROCK MINING ON FEDERAL AND STATE LANDS

APRIL 19, 1990

Printed for the use of the
Committee on Energy and Natural Resources

U.S. GOVERNMENT PRINTING OFFICE
32-856 WASHINGTON : 1990

For sale by the Superintendent of Documents, Congressional Sales Office
U.S. Government Printing Office, Washington, DC 20402

S311-5D

COMMITTEE ON ENERGY AND NATURAL RESOURCES

J. BENNETT JOHNSTON, Louisiana, *Chairman*

DALE BUMPERS, Arkansas
WENDELL H. FORD, Kentucky
HOWARD M. METZENBAUM, Ohio
BILL BRADLEY, New Jersey
JEFF BINGAMAN, New Mexico
TIMOTHY E. WIRTH, Colorado
KENT CONRAD, North Dakota
HOWELL T. HEFLIN, Alabama
JOHN D. ROCKEFELLER IV, West Virginia

JAMES A. McCLURE, Idaho
MARK O. HATFIELD, Oregon
PETE V. DOMENICI, New Mexico
MALCOLM WALLOP, Wyoming
FRANK H. MURKOWSKI, Alaska
DON NICKLES, Oklahoma
CONRAD BURNS, Montana
JAKE GARN, Utah
MITCH McCONNELL, Kentucky

DARYL OWEN, *Staff Director*
D. MICHAEL HARVEY, *Chief Counsel*
FRANK M. CUSHING, *Staff Director for the Minority*
GARY G. ELLSWORTH, *Chief Counsel for the Minority*

SUBCOMMITTEE ON MINERAL RESOURCES DEVELOPMENT AND PRODUCTION

JEFF BINGAMAN, New Mexico, *Chairman*
HOWELL T. HEFLIN, Alabama, *Vice Chairman*

DALE BUMPERS, Arkansas
WENDELL H. FORD, Kentucky
KENT CONRAD, North Dakota

FRANK H. MURKOWSKI, Alaska
MITCH McCONNELL, Kentucky
MALCOLM WALLOP, Wyoming
DON NICKLES, Oklahoma

J. BENNETT JOHNSTON and JAMES A. McCLURE are Ex Officio Members of the Subcommittee
LISA VEHMAS, *Professional Staff Member*
PATRICIA KENNEDY, *Professional Staff Member (Minority)*

CONTENTS

Page

Barry, Hamlet J. III, executive director, Colorado Department of Natural Resources 52
Belsky, Edward M., chartered property and casualty underwriter, Frank B. Hall & Co. of Washington 73
Bingaman, Hon. Jeff, U.S. Senator from New Mexico 1
Bumpers, Hon. Dale, U.S. Senator from Arkansas 2
DeGuire, Marcel F., vice president, Environmental Affairs and Metallurgical Research, Newmont Gold Co. 80
Fitzpatrick, John S., director, Community and Governmental Affairs, Pegasus Gold Corp 91
Gregory, Michael, codirector, Arizona Toxics Information Project 126
Henson, Larry, Associate Deputy Chief, National Forest System, Forest Service, Department of Agriculture 43
Jamison, Cy, Director, Bureau of Land Management, Department of the Interior 29
McClure, Hon. James A., U.S. Senator from Idaho 15
Miller, Dr. Glenn, professor of biochemistry, University of Nevada, Reno, NV 112
Murkowski, Hon. Frank H., U.S. Senator from Alaska 27
Parks, Richard, secretary, Northern Plains Resource Council 103

APPENDIXES

APPENDIX I

Responses to additional questions 223

APPENDIX II

Additional material submitted for the record 306

HARD ROCK MINING

THURSDAY, APRIL 19, 1990

U.S. SENATE,
SUBCOMMITTEE ON MINERAL RESOURCES
DEVELOPMENT AND PRODUCTION,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The subcommittee met, pursuant to notice, at 2:03 p.m., in room SD-366, Dirksen Senate Office Building, Hon. Jeff Bingaman presiding.

OPENING STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR FROM NEW MEXICO

Senator BINGAMAN. The hearing will come to order. This afternoon we have an oversight hearing which was scheduled to examine reclamation and bonding practices associated with hard rock mining on Federal and state lands.

According to the BLM, during fiscal year 1988 there were over 1.2 million outstanding mining claims covering approximately 44 million acres of Federal lands. BLM estimates that there are 748 producing mines on BLM lands and 1,209 on Forest Service lands.

The 1872 Mining Law does not specify reclamation or bonding requirements, but states that mining on Federal lands is to be conducted pursuant to regulations and is subject to the laws of the United States. The Federal Land Policy and Management Act governs surface management of hard rock mining activities on BLM land. FLPMA requires that the Secretary shall take any action necessary to prevent unnecessary or undue degradation of the lands. BLM issued surface management regulations in 1981 to establish procedures to implement this mandate.

On Forest Service lands, regulations require mining operations to be conducted so as to minimize adverse environmental impacts on surface resources. In addition, many states have passed reclamation laws. In certain circumstances the state and BLM or Forest Service have negotiated memoranda of understanding detailing responsibilities of each of those parties.

We look forward to hearing from the witnesses today regarding the adequacy of these statutory and regulatory provisions to ensure that hard rock mining activities are being conducted in a manner that provides adequately for environmental protection. Senator Bumpers who is very interested in this set of issues, will be here shortly to participate.

[The prepared statements of Senators Bumpers, McClure and Murkowski follow:]

STATEMENT OF SENATOR DALE BUMPERS
OVERSIGHT HEARING
ON
RECLAMATION AND BONDING PRACTICES ASSOCIATED WITH
HARD ROCK MINING ON FEDERAL AND STATE LANDS
SUBCOMMITTEE ON MINERAL RESOURCES DEVELOPMENT AND PRODUCTION
COMMITTEE ON ENERGY AND NATURAL RESOURCES
APRIL 19,1990

Good afternoon. Today, the subcommittee on Mineral Resources Development and Production will take testimony on the reclamation and bonding practices for hardrock mining activities on state and federal lands. I want to thank Chairman Bingaman and his staff for arranging this hearing and to especially thank the witnesses who have traveled a considerable distance to be with us today.

Without land reclamation requirements, mining can destroy vegetation and wildlife habitat, contribute to air and water pollution and soil erosion, create health and safety hazards, and leave unsightly scars on the land. For a long time, these impacts of mining were simply accepted. Now however, I believe that most of us would agree that environmental quality should not take second place to mineral development. Obviously we need minerals and mining, and we need to develop our domestic mineral resources. But development must maintain environmental quality.

We celebrate the 20th anniversary of Earth Day this week and I noticed that the most recent American Mining Congress Journal was entitled "Every Day is Earth Day for Miners". In the two decades since the first Earth Day, a number of environmental statutes have been enacted that regulate mining activities. In addition, a number of mining companies have taken a positive stance toward environmental protection. However, the level of public concern regarding the environmental impacts of mining is still high.

Today we will focus on the surface management regulations of the Forest Service and the Bureau of Land Management, as well as state reclamation and bonding laws. Are these laws adequate? Is there too much or too little agency discretion? Is enforcement adequate? Does bonding assure satisfactory reclamation?

I am also interested in the differences between Forest Service and BLM regulations and state laws. For example, I was struck by contrasting BLM and Forest Service statements in a House oversight hearing on reclamation and bonding last year. One the one hand, the Forest Service witness testified that Forest Service policy requires financial guarantees to cover reclamation costs where more than significant disturbance is going to occur; that 90% of their plans of operations have bonds; that "we are not aware of any instances where mine operators abandoned plans to develop a mine because we required them to post a financial guarantee; and further, that "the mining industry generally supports the need to reclaim ... and the need for financial guarantees to ensure reclamation."

On the other hand, former BLM Director Burford explained that after much criticism of the bonding requirements in BLM's proposed surface management regs, BLM adopted a policy of optional bonding. We know from other testimony submitted to this subcommittee, that only about 22% of the operations on BLM land are bonded. He then stated: "Bonding was a controversial subject during the development of the regulations and remains a controversial subject today."

How are we to reconcile these two statements and policies? Are BLM and Forest Service hearing different things from the same miners? Does one agency have a more flexible definition of "bonding" or "financial guarantees"? Or is one agency simply more sensitive to "controversial" subjects?

I will withhold any further questions until we have heard from the witnesses. Do any other Senators wish to make opening statements at this time?

Thank you. With that, I'd like to welcome our first panel. Mr. Cy Jamison, Director of the BLM; Larry Henson, Associate Deputy Chief of the Forest Service; and Hamlet Barry, Executive Director of the Colorado Department of Natural Resources. Your full statements will be included in the record; please feel free to summarize.

Press Release from

Senator Dale Bumpers

(202) 224-4843 229 Dirksen Bldg., Washington, D.C. 20510

CONTACT: Melissa Skolfield

April 19, 1990

- REFORM OF THE 1872 MINING LAW -
BONDING AND RECLAMATION
FACT SHEET

* Approximately 1.2 million mining claims covering 44 million acres of federal land are outstanding under the 1872 Mining Act. The Act does not require reclamation of damaged land, or the bonding of miners to guarantee reclamation.

* The General Accounting Office (GAO) estimated in 1988 that 424,049 acres of federal land in 11 states are unreclaimed. It would take at least $284 million to repair the environmental damage caused by mining on this land.

* Mining on federal land is governed by either the Bureau of Land Management (BLM) or the Forest Service. While 90 percent of mining operations that file plans with the Forest Service have been required to file bonds, the Bureau of Land Management has been much more lax.

* On BLM land, miners with claims of less than five acres are simply required to give the agency notice that they are beginning their operations. Bonds and reclamation plans are not required of these miners. In 1988 alone, 2034 new notices were filed.

* For mining operations on more than five acres of BLM land, plans of operation must be filed. However, environmental reclamation is only required if the miner forsees surface disturbance "greater than what would normally result" from mining. Bonds may also be required, but only at the discretion of BLM officials.

* In 1988, 469 additional plans of operation were filed with BLM. No plan of operation has been denied in the past ten years.

* A recent BLM review of 748 mining operations showed that only 22 percent were bonded to ensure reclamation. And 95 percent of those bonds were required by state agencies, not by BLM.

Press Release from

Senator Dale Bumpers

(202) 224-4843 229 Dirksen Bldg., Washington, D.C. 20510

CONTACT: Melissa Skolfield

June 6, 1989

- REFORM OF THE 1872 MINING LAW -
FACT SHEET

CURRENT LAW

The Mining Law of 1872 was enacted to promote development of the western states by allowing individuals to prospect on federal land for hard rock minerals such as gold, silver, lead, iron, and copper.

If a valuable deposit is found on federal land, the law allows any individual or company to file a claim to the property and sell the minerals -- without paying the government any fees or royalties. That claim can continue indefinitely if the miner performs at least $100 worth of work each year -- the same amount required in 1872.

After obtaining a claim, miners can receive outright ownership of the land (patent) with proof that a valuable deposit has been found and $500 worth of work performed. The law sets a price of just $2.50 an acre (for "placer" claims) or $5.00 an acre (for "lode" claims) -- the approximate price of western land in 1872.

Again, the federal government receives no royalties, lease fees, or bonuses when the minerals are sold. There are also no restrictions on the use or sale of the land after the patent is obtained.

BUMPERS REFORM ACT

Senator Bumpers' reform legislation, the Mining Law of 1989, updates this outmoded law and brings it into compliance with current federal resource policy. Key aspects of the bill address the issues of fair payment of royalties, environmental protection, and land reclamation.

ENVIRONMENTAL PROTECTION

The 1872 mining law gives the federal government very little power to regulate the environmental impact of mining activity, which often involves hazardous substances. One new concern is the use of cyanide to extract microscopic specks of gold from low-grade ore, a hazardous method of gold "mining" increasingly widespread in western states.

Bumpers' reform legislation gives the federal government explicit new authority to regulate mining activities which threaten the environment. In addition, mining activities would have to comply with all current state and federal environmental laws, and would have to be integrated into the federal government's land use plans.

RECLAMATION

The 1872 Mining Law contains no language governing land reclamation. Large abandoned mines now scar many acres of public land because of inadequate federal supervision. While mining companies can be required to post bonds to encourage reclamation, these modest financial incentives are often ignored.

Senator Bumpers' reform legislation would require that operation and reclamation plans be filed before exploration begins; operations smaller than five acres are currently not required to file such plans.

In addition, the bill would establish reclamation standards for all surface disturbance. Bonds or other forms of security would be required of all miners to insure complete and timely reclamation.

ROYALTIES

The 1872 Mining Law is the only system of its kind which does not require a royalty payment when valuable deposits are sold, or prohibit the outright sale of government land.

The resulting revenue loss to the federal treasury is considerable. According to a recent GAO study of 20 patents sold since 1970, the federal government has sold land worth up to $47 million for just $4,500. And a rough estimate by The Wilderness Society puts the value of public domain minerals sold each year at approximately $3.9 billion.

Bumpers' reform legislation would give the federal government an overriding royalty of eight percent of the value of minerals found: the same royalty now required in coal mining. These royalties would be split evenly between the federal government and the states.

The bill also creates a new patent system for mineral deposits only; prohibits the outright sale of federal land; requires a surface use fee of at least $5.00 per acre; and stipulates that ownership of the minerals reverts back to the federal government when production ends, or after 15 years.

Claims are limited to 20 acres, and in order to ensure diligent development, the work requirement is increased to at least $1000 per year. This work requirement is increased in stages after five years, and a cash payment in lieu of work is permitted to reduce needless damage.

Senator Bumpers (D-AR) is a member of the subcommittee and the ranking Democrat on the full committee.

United States General Accounting Office

GAO

Briefing Report to the Chairman, Subcommittee on Mining and Natural Resources, Committee on Interior and Insular Affairs, House of Representatives

April 1988

FEDERAL LAND MANAGEMENT

An Assessment of Hardrock Mining Damage

GAO/RCED-88-123BR

SECTION 1

THE EXTENT OF FEDERAL LAND LEFT UNRECLAIMED FROM HARDROCK MINING

This section discusses the magnitude of federal land left unreclaimed from hardrock mining, the type of reclamation needed, the estimated cost of reclamation, and the types of mining claims involved. We based our estimates on a sample of quarter sections of federal land (one quarter section equals about 160 acres) that contained active mining claims between October 1976 and December 1986 in Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.[1]

We estimate that 424,049 acres of federal land disturbed by hardrock mining operations are unreclaimed. Of this amount, 142,468 acres (about 33 percent) are active authorized mining operations. The other 281,581 acres are abandoned, suspended, or unauthorized mining operations, as follows:

- -- Abandoned or suspended mining operations account for 270,560 acres (about 64 percent) of unreclaimed federal land. This includes 196,612 acres on which operations have been abandoned and 12,298 acres on which operations have been suspended and which require reclamation; however, reclamation was not planned or occurring at the time of our review. Reclamation was either underway, planned, or not required at the time of our review for the remaining 61,650 acres.
- -- Unauthorized mining operations account for 11,021 acres (about 3 percent) of unreclaimed land. (See fig. 1.1.)

---

[1] To be considered active, a mining claim must have a current annual assessment affidavit on file with Interior's Bureau of Land Management stating that the claim holder has met the legal requirements for holding a claim.

Figure 1.1: Projected Acres of Unreclaimed Federal Land Resulting From Hardrock Mining

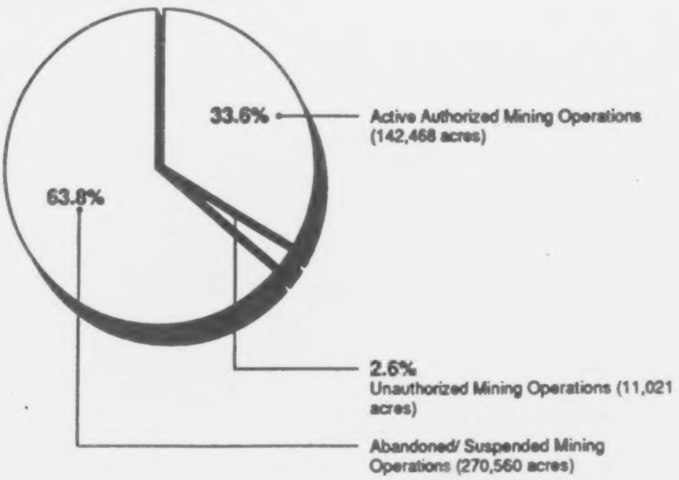


Table 1.1 shows the types of reclamation actions needed for the 281,581 acres of unreclaimed federal land, excluding 60,054 acres either undergoing reclamation or not requiring reclamation at the time of our review.

Table 1.1: Types of Reclamation Action Needed For Federal Land Related To Abandoned, Suspended, and Unauthorized Mining Operations

Reclamation action needed	Acres[a]
Reshaping or recontouring of surface	162,911
Reseeding	157,322
Top soil replacement	68,040
Vegetation replacement	57,179
Mine waste, harmful materials, or other litter requiring removal or disposal	24,916
Measures to control erosion, landslides, and water runoff	74,236
Closing of mine shafts and openings	26,034
Capping or plugging drillholes	5,271
Removal of structures, equipment, and materials	23,159
Other actions needed to restore land or ensure public safety	6,548

[a] The sum of the acres will exceed the total number of projected unreclaimed acres because some sites require more than one type of reclamation action to restore the land to an acceptable condition.

BLM and Forest Service land management officials provided us with reclamation cost estimates for the unreclaimed land they identified in our sample of quarter sections. Mine operators are not required to reclaim disturbances that occurred before agency reclamation regulations were implemented. The Forest Service's reclamation regulations apply only to mining disturbances created after August 1974. The Bureau of Land Management's reclamation requirements apply to mining disturbances created in 1981 or later. On the basis of our projections, the total cost to reclaim the 281,581 acres of disturbed federal land is about $284 million, broken down as follows:[2]

-- about $196 million to reclaim 161,314 acres of land disturbed prior to the date reclamation regulations took effect,

-- about $49 million to reclaim 48,874 acres of land disturbed after the date reclamation regulations took effect, and

-- about $39 million to reclaim 71,393 acres of land for which federal officials are unsure when the disturbance occurred. (See fig. 1.2.)

---

[2] The $284 million includes about $17 million for acreage either being reclaimed or not needing reclamation at the time of our review. The estimated reclamation cost for the 142,468 acres of active authorized mining operations is not included.

OPENING STATEMENT OF SENATOR McCLURE

OVERSIGHT HEARING ON RECLAMATION AND BONDING

APRIL 19, 1990

This afternoon we will take a look at reclamation and bonding practices associated with hardrock mining on Federal and State lands. I am hopeful that this will be a useful session, enabling us to understand both the current laws and regulations governing these activities and the manner in which they are carried out. I look forward to the testimony of witnesses as to whether current regulations are working to ensure the reclamation of mined Federal lands. If there are problems with these regulations, I hope we will hear responsible suggestions as to how they can be improved.

I will be particularly interested in the testimony and recommendations of witnesses with respect to the issue of bonding. This Senator is extremely concerned that while we want to make sure that reclamation is performed, we do not want to make bonding requirements so onerous that they will put small operators out of business. Clearly, there is a downward trend in the availability of bonds and an upward trend in the cost of securing these bonds. I am aware that attention is being given to identifying new means of financial guarantees. I hope this hearing will serve to bring out some of these innovative proposals.

Mr. Chairman, I would also like to take this opportunity to express my views on a recent series of articles published by the **Sacramento Bee** on the mining law, the mining industry and mining operations. To be blunt, I was disgusted by the series and believe it was a disservice not only to the mining industry, but also to Bee readers who should be able to expect well-researched, balanced news articles. The series entitled, "Golden Land, Shattered Earth" was misleading, filled with inaccuracies, and was obviously intended to convey only the views of individuals seeking to overhaul the 1872 Mining Law. I understand that a response to the Sacramento Bee series is being prepared by the California Mining Association and I ask unanimous consent that the rebuttal be printed in the hearing record following my statement.

Conclusions Without Substance:
"Golden Land, Shattered Earth"
A Response Of The Mining Industry
To The Sacramento Bee

The mining industry has been scourged, chastised and
charged by intimation and innuendo
with activities that have not occurred and for attitudes which do not exist.

Presented to *Sacramento Bee* Executive Editor Gregory Favre
April 17, 1990
By representatives of
The California Mining Association

For more information contact:
The California Mining Association
1010 Eleventh Street, Suite 213
Sacramento, CA 95814
916/447-1977

Introduction

Under the guise of researched, documented news stories the readers of the *Sacramento Bee* have been seriously misled in the recent series "Golden Land, Shattered Earth" by errors in fact and a seemingly purposeful lack of balance.

Careful scrutiny is an important part of the democratic process. The mining industry recognizes the need for a diligent press to act as a watchdog for the general public welfare. The industry does not criticize the media's focus on issues of creative tension between producers and critics -- a thoughtful, balanced presentation of those divergent viewpoints would indeed be helpful in guiding policy making and public interest.

However, the presentation and reporting of this series is so intentionally incomplete that it serves only to misinform rather than to act as a credible source for stimulating productive policy debate.

Perhaps the grandest example of the series' misleading reporting is the consistent theme that the mining industry is arrogantly casual about environmental issues and that it actively rebuffs all regulatory suggestions. In fact, the industry has led the way in many instances in focusing attention on potential areas of environmental consideration. Several years ago, for example, the industry suggested a test for acid mine discharge -- reflecting the body of knowledge and expertise from within the industry and concern about impacts from old mine workings.

The Mining Waste Study prepared by the University of California, Berkeley which is cited repeatedly in this series was proposed initially by the industry. The industry lobbied diligently for the combined commissioning of the study by the Legislature, the State Water Resources Control Board, the Department of Health Services and the California Department of Conservation to assure a document that would be credible in the public policy arena. The essence of the conclusions of that study encourage oversight of the industry while finding that its impacts do not pose extraordinary environmental or health risks, contrary to the out-of-context innuendos in the series.

One of the more troubling conclusions presented in the series is that mining industry political power has effectively shielded it from environmental controls or other restrictions on its ability to operate. As detailed in this response, nothing could be further from the truth. The mining industry is one of the most regulated and controlled industries in the world -- particularly in California. The technological sophistication of today's industry -- unfortunately not described to the readers of the *Sacramento Bee* -- makes it possible to meet this country's voracious appetite for minerals with minimal surface disturbance and limited numbers of operations.

Claims of political muscle-flexing are hackneyed excuses of industry critics to explain the failure of their political agenda. Mining companies rank among the lowest in funding either industry or company public relations activities and their political contribution record is so minimal it is barely recognized in busy capitals such as Washington and Sacramento.

The policies desired by those industry critics have been rebuffed to date, not because of industry political power but because their proposals lack merit. Those charged with regulating the industry -- unlike the reporter for this series -- see through the political agenda fueling these criticisms. They recognize the effectiveness of the extensive regulatory framework applied to the industry and appreciate the need to maintain a domestic minerals industry which is sensitive to environmental concerns.

The industry critics relied upon for the essence of these stories misled the reporter seriously in this and other issues.

This response addresses key areas of misconception and cites examples of the numerous glaring errors of omission and fact which are designed to lead readers to inaccurate conclusions. These conclusions reflect omission of the many knowledgeable, scientific sources referenced for information, the reporter's refusal of an invitation to participate in a tour of California mining operations, and a failure to follow-up for additional information.

Additional information and details on any of these or other points is available through the California Mining Association and other industry representatives.

Past these citations of error, however, is the disastrous public image painted for a largely uninformed citizenry -- a citizenry dependent upon mineral production for the high standard of living enjoyed in this country. A resourceful and responsible industry has been unnecessarily and terribly wronged. No response of this nature nor cursory acknowledgement by the publication can rectify such lasting damage.

Four areas reflect the most serious misinterpretations of fact which misinform readers: Public safety, environmental responsibility, land use, and regulatory effectiveness.

Public Safety

A repeated litany of inflammatory descriptions by innuendo charges that mining operations pose a risk to public safety. Readers of the *Sacramento Bee* are regaled with colorful language painting a picture of "mine-related poisons" upstream from major cities "waiting for the next thunderstorm ..." of children impaired by metals poisonings ... of allegations that "troubled mines" endanger the West.

The color and language are remarkable. The facts are absent. The data is misquoted.

Though there is repeated reference to the Berkeley Mine Waste study, which explicitly points out that the Department of Health Services and the State Water Resources Control Board have jurisdiction and interest in mining matters in California, there is no research or citation from such expert sources. Rather, anecdotal information from self-proclaimed industry critics paints a picture which is not true.

The mining industry is well aware of historic mine sites with potential for environmental impacts. Its diligence in this arena already has been noted. The context for these problems -- and resulting public health concerns -- is important and well documented in the Berkeley Mine Waste study:

> "(Although there are potential threats from heavy metals) in our investigations we were unable to uncover any evidence that any of these forms of pollution caused by mining wastes in this state have ever resulted in illness or death of any individual."

The series intimates that mining causes asbestos in the California aqueduct, and mercury in drinking water -- innuendos which are errors in fact and quotations directly out of context. In fact, the Berkeley Mine Waste study points out asbestos discharge into the aqueduct is "infrequent" and very possibly not directly related to mining:

> "As in the case for mercury contamination, it is unclear how much of this asbestos pollution problem is caused by mining activity. There are reports that high concentrations of asbestos fibers are found in the California aqueduct well upstream of the region where mining activity has occurred."

In fact, California's state rock is serpentine -- the host rock for asbestos. It is commonly found in the state and runoff in many locations where there are no mines may be found to contain asbestos fibers.

Glowering terms throughout the series suggest conspiratorial attitudes of unnamed and countless operators to endanger public health and welfare. Readers are left with the impression that "hundreds of square miles" ooze with horrible concoctions left or created continually by mining operators.

As detailed in the Mine Waste Study, and readily acknowledged by the industry, there are some sites in this state and elsewhere which reflect the mining practices of people who operated without the benefit of today's technology or today's sensitivity. In contrast to the "thousands (probably tens of thousands) of mines (during California's history that) have been worked and later abandoned", the Mine Waste Study identifies a "handful" of operators -- nine sites identified in that document -- as potential problems.

> "In general, we believe that the environmental and public health threats from current mining operations are substantially less than threats from older, abandoned operations. This improvement is due in large part to the fact that different minerals are being produced and different mining and extraction techniques are being employed."

We don't read that quote in the *Sacramento Bee*, however. Rather, people with no applicable credentials are quoted with undocumented generalizations that charge today's highly regulated mining industry with allegedly continuing historic practices which have been shown to have a likelihood of negative environmental impact. This is untrue and a body of scientific, expert evidence is easily available to refute those politically-motivated claims. They do not deserve credence and should not have been used in that context.

To further color the series, common anecdotes of industry critics are reported as facts, including reference to dangers to children in Colorado and evacuation of housing tracts.

We as society know now -- which we didn't know in past decades -- that buildings must be made earthquake safe and housing developments should not be constructed on fault lines. We as society and as an industry know now that homes and playgrounds should not be built on mine dumps and tailings unless those areas have been tested carefully for residues of naturally-occurring minerals. Conditions which would leave a site in such a state are not continuing and are not created by contemporary mining practices.

Unfortunately for the readers of the *Sacramento Bee*, the references to the children of Leadville, Colorado apparently were not checked with local officials. Mayor James Martin of Leadville reports that numerous tests were performed on the children -- with no unusual findings for any substances such as arsenic or cadmium. Furthermore, though lead levels in some children were elevated, none were considered to be dangerous or toxic according to federal government standards, in dramatic contrast to the only quotations used in this series.

Similarly available from Mayor Martin and others in Leadville is information which refutes any intimation that municipal drinking water supplies downstream on the Arkansas River are unsafe.

As Mayor Martin has said in a letter in the *Rocky Mountain News* in response to another undocumented media attack on his area: "This ... gives one the impression that it is an unhealthy place to live. Nothing could be further from the truth."

Certainly, the *Bee* should have independently verified the accuracy of second-hand charges.

Mine operators forge close allegiances with their communities, support community activities, and contribute significantly to local economies. Their concern and attention to public well-being is well documented. These errors and contextual misrepresentations are simply examples of an unwarranted attack on an enviable record of community sensitivity. They have no place in a respected publication of general circulation.

Environmental Responsibility

In the same colorful tone, readers of the *Sacramento Bee* are told of towering piles of mining waste, hundreds of acres of unclaimed mines "like measles" dotting the land, and a recurring tragedy of mining abuses.

For example, readers are told that the Arkansas River in Colorado "is fouled" by mining and that a tributary called California Gulch "dumps 250 tons (of metals) a year into the river." It is colorfully called the dead zone. Readers are not told, however, that a new surge pond has been constructed and that treatment plants for the Yak Tunnel and Leadville Drainage Tunnel are being put into place. Nor are they informed of a $20 million price tag being carried by a Colorado mining company to rectify drainage problems on a closed operation.

Readers also are not told of a state environmental award last year to a mining company for bringing fish back to Colorado's Ten Mile Creek or commendations from the U.S. Forest Service to four major operators in Idaho and Montana for the environmental accomplishments of their operations. Nor are they told of the voluntary program by a Northern California mine to clean up the workings of an old mercury mine -- a site not even on its property.

Indeed, the examples of environmental concern and compliance from today's mine operators are as evident as those of problems stemming from mine sites which in many cases have not been operated for decades. The *Bee* series wishes readers to assume that mining companies are not working to rectify historic problems -- and that they are not shouldering responsibilities. That is not true and gross overstatements of fact are used to justify that conclusion.

For example, a dramatic graphic cries out to readers as "a legacy of troubled mines" with 51 colored triangles on a map of 11 Western states. Even a cursory review of that map, however, shows that as many as 20 percent of those triangles are not mines at all, but some type of metals manufacturing or refining location.

Several aluminum sites are listed, for example. Aluminum is not mined -- it is manufactured from several mined materials. Metals are used for many manufacturing purposes, but those sites reflect the many end-use demands for mine products, not mining practices.

With this reasoning, a map of pulp and paper manufacturing sites would also reference all newspapers which use their products. The rationale is obviously misleading and certainly does not deserve to be presented as a picture of minerals impact.

The map reflects a review of the Superfund list from the Environmental Protection Agency (EPA). That list is available to the public and should be reviewed by anyone interested in a perspective on the *Bee*'s reporting of this issue. In contrast to the series' conclusions, mines are not predominant on that list in proportion to sites identified for a wide range of industries. Was it the lack of mines on the list that led the *Bee* to reference virtually any metallic processing in order to make a point? That point is not factual.

Even a summary review of the state's historic mining activity will show that virtually every section of California has hosted periodic mining activity. The *Bee* would have readers believe that every old mine shaft leaks some sort of noxious material. There are some selected sites – nine are identified by the state – which are problems. But to suggest that those identified sites represent a majority of historic or current mine locations is absolutely false.

In Fact, of almost 500 mines which carry waste discharge requirements from state and regional water boards (almost three-quarters of them pre-dating the 1984 implementation of the regulation), only 32 are under enforcement actions. Only five of those are newer operations and those enforcement actions are not related to waste containment, but to spillage or construction. All the enforcement actions have been or are being resolved.

The series is filled with gross misstatements of fact. For example, readers are told that mining waste "piles up at the rate of 30 billion tons a year, making the industry the nation's second largest waste producer behind agriculture," attributed to the EPA.

In fact, however, in a report to Congress entitled "Wastes from the Extraction and Beneficiation of Metallic Ores, Phosphate Rock, Asbestos, Overburden from Uranium Mining and Oil Shale," the EPA reports those segments of the industry generate "1 to 2 billion tons of waste each year ..."

And what is mining waste? By inference the *Bee* would have readers assume it is a metallic-laced dangerous product. In reality, however, it is rock. According to the EPA, half of the 1 to 2 billion tons per year is mine waste – rock moved to afford access to ore zones which lie beneath it. One-third of that amount is tailings -- rock which has been crushed, milled and processed to extract the mineral. A far different image than that painted by the *Bee* series.

Use of cyanide in gold mining has become a controversial issue by reports such as this *Bee* series. As is the case with other issues covered by the series, scientific, proven information about cyanide and its effects is ignored. Rather, totally undocumented charges are presented as fact by quoting non-industry academics in their claims about groundwater contamination, metals leaching and wildlife impacts. Blanket statements assert problems "swirling around this newfangled mining" but no case study or factual information is presented.

Ironically, it would have been very easy for the *Sacramento Bee* to secure independent, excellent historic and contemporary evidence of cyanide use within just a few hours drive from its offices – yet no apparent attempt was made to undertake even that cursory research.

Cyanide is not new in gold mining. Historic records show that in the 1920's and 1930's cyanide processing plants were set up in several locations in California's Mother Lode to process tailings from the underground mines. Given the time, those plants operated with few environmental restrictions. Yet today, those same locations are free of cyanide, there has been no reported impact on the population from groundwater contamination or other effects.

In contrast, a modern-day Mother Lode operation documents eloquently the many regulations and requirements affecting its heap-leach operation which is being closed and reclaimed as required by law. That operation experienced a spill of gold-bearing cyanide solution on a stream course draining to the New Melones Reservoir, 1,500 feet away. Sampling was undertaken repeatedly at several locations. The result: No mortality of aquatic organisms. No impact on ground water. No surface damage. The company was required to institute new design measures, it was subject to an administrative civil liabilities enforcement action, assessed and paid a monetary fine.. This incident is providing excellent case study documentation on the speed of attenuation -- or natural deterioration – of cyanide. Such information certainly should have been germane to the *Bee* series.

This type of documentation and case study information is not unique. Yet readers of the *Sacramento Bee* did not have the opportunity to learn of them.

Rather, readers were fed untrue, slanderous allegations of miners killing animals and birds and burying them to avoid detection -- charges that do not even logically follow the information presented in the same story about millions of dollars spent on wildlife mitigation. In fact, the industry's voluntary reporting and programs to rectify wildlife problems set the stage for requirements now embraced by regulators. Charges of cover-ups and under-reporting of wildlife mortality used in this series have been made for several years -- yet not one of those charges has been proven true. Interestingly, in a recent incident in New Mexico one of this series' sources quick to fire allegations concerning cyanide residue completely reversed a previously stated opinion when pressed for documentation of his charges.

Even though industry critics repeat them time and again -- the charges still are not and never will be fact. They should not be treated as fact in a series of stories allegedly prepared to scrutinize public policy.

Similarly, the use of bird mortality figures is inflammatory and inaccurate in conveying impacts of cyanide use in gold production. The reporter was given information about the lack of significant impact on birds from California gold mines. Indicating he was pressed for deadline, he said he would make future contact to get more details. He did not do that.

Regrettably, some of the first Nevada operations did experience unexpected impacts on wildlife. Tremendous effort at particularly sensitive mine sites dramatically decreased those impacts. As a matter of perspective, 10 billion birds die annually -- 87 percent of those from disease, according to research conducted by Dr. William Jackson, professor emeritus of biological sciences, Bowling Green State University. Of the remaining mortalities, 80 million die from running into windows, 1 million from running into transmission towers and almost 100 million are harvested annually by hunters.

In 1988, 40 gold operations reported 2,758 migratory bird fatalities, with 68 of 157 cyanide-using operations taking steps to prevent such occurrences (some operations are located in areas not affected by migratory bird traffic). Estimates indicate an average of $5,000 has been spent per bird to resolve the problem. Many extraordinary measures developed voluntarily to resolve wildlife problems were showcased at a recent conference in Reno but the *Bee* did not provide news coverage of that event. This image is hardly consistent with the off-the-cuff accusatory remarks of industry critics given such credibility in the *Bee* series. *Bee* readers deserved the opportunity to judge the merits of those accusations in their true perspective. They did not receive that opportunity.

Land Use

According to the *Sacramento Bee*, miners run unfettered on public lands -- doing what they want where they want. The *Bee* claims that as long as someone can find a mineral deposit, miners can do as they wish with it -- and that they are doing it with abandon anywhere and everywhere. This is yet another misleading image.

Both the actual and potential impact from mineral development is very small. The vast array of factors affecting development of a mineral property -- economics, technology, operational considerations and environmental requirements -- mean that few mining claims become mines. The volatility of those factors also means there must be quite a search to locate those few sites where criteria will come together to make a mine feasible. As both technological and environmental considerations for mines increase, finding a suitable mineral location becomes increasingly difficult.

While the *Bee* emotionally equates mineral impact to sizes of states, the factual indicator of the magnitude of surface disturbance related to mining is numeric: Less than 1 percent of the land in this country has ever been disturbed by mining.

In the case of mining on public lands, there are about 750 million acres of public lands in this country -- most of it located in the Western United States. About 50 percent of that is not available for mineral development through designation as wilderness, parks, wildlife refuges and other special protective measures.

Of the approximately 350 million acres of public lands theoretically available for mineral exploration, only 10 percent of that is held in mining claims. A total of 1.2 million claims are on record, covering an estimated 35 million acres. A small percentage of that land is in mining. In California for example, while 17,663 mining claims were recorded in 1989, only 189 plans of operation and 173 notices of intent -- both indicators of planned or potential development or exploration activity -- were reviewed.

Patenting, which gives mineral operators title to land upon which they are located, is very minimal. In the 117 years since passage of the 1872 Mining Law, only 3.2 million acres have been patented -- about 2/10ths of 1 percent of the public domain land available in 1872, 4/10ths of 1 percent of today's total public lands and 9/10ths of 1 percent of the land theoretically currently available for mineral exploration and development. In California, for example, seven mineral patent applications were processed in 1989; eight in 1988 and five in 1987. Patenting is not a common practice.

These statistics dispute the undocumented accusations so dominant in the Bee series -- charges that "everywhere you look there is another mine", that "you can look around and see these craters everywhere." Indeed, those characterizations are being made to take advantage of the obvious -- there are not very many mines, therefore the general public has little opportunity to become personally conversant with them, with their impact and with their operations. Those who make their living from groups politically motivated to oppose the mining industry are able to play unfairly on these types of characterizations.

It is unfortunate that the *Bee* allowed itself to be used to perpetuate these inaccurate stereotypes. Any number of opportunities – including airline flights, maps and other data – could have provided the proper perspective for the actual impact of mineral activity. Rather, the *Bee* apparently chose to amplify these misconceptions by using graphics to mark mines with symbols which greatly exaggerate both the mine's land area and actual surface disturbance.

Perhaps it is recognition of the minimal impact of mining – both contemporary or historic – which leads to conclusions in these stories of "hidden problems" and issues "not well known because they are occurring out of the sight of television cameras." The *Bee* has not stumbled on a "hidden problem" as it would like its readers to believe. Rather, it is presenting the minimal impact of mining in the West as an environmental catastrophe and seriously misleading its readers.

Regulatory Effectiveness

In keeping with the tone of these articles, ominous statements tell the reader that the few laws which apply to mining operations are not working, that reclamation is not being performed and that the Mining Law allows -- or even encourages -- societal miscreants to terrorize each other and nearby communities.

Had these colorful anecdotes been independently verified, or had the regulatory framework associated with mining been researched, the emphasis of this series may have been very different.

For example, readers are told of "trails of rubble and ruin" that mines continue to leave across the West. They aren't told, though, that mining companies commonly may be required to satisfy more than 400 stipulations and conditions, many on a day-to-day basis. Charts and similar graphics illustrating the exacting and extensive permitting framework are available. The reader deserves to have that information in judging the merits of this series.

While requirements vary with geographic conditions, common permits and regulatory oversight for contemporary mining in California include:

- Federal land management agencies: Environmental impact statements, plans of operation, reclamation bonds.
- California Regional Water Quality Control Board: Waste discharge requirements for tailings, for waste rock, and for other disturbed rock and reclamation bonds.
- Water Resources Control Board: Permits for diversion and use of water.
- Department of Water Resources: Approval of construction or enlargement of holding dams or reservoirs.
- Department of Health Services: Determination of waste status.
- Local County: Site approval and reclamation plan from the planning commission; Numerous permits from the air pollution control district; grading plan permits as well as permits for any building from the building department; permits for each water well, for domestic waste systems, for any chemicals used onsite and for waste storage from the county's environmental health services department; approval for purchase and use of explosives from the county sheriff.

Statements that "if you can find it, you can have it" are blatantly false. The reality of mining is, if you find it and can take care of the environment in developing it -- then you might be able to have it. That perspective is an interesting story, one that shows how the reality of law changes and accommodates new societal values. It is a story that *Bee* readers deserved to be told.

In one of the many sweeping statements in the series, the assertion is made that laws such as the Federal Land Policy Management Act (FLPMA) and California's Surface Mining and Reclamation Act (SMARA) as well as regulations in many other states simply are not working.

But where is the acknowledgement that all mine development must comply with the National Environmental Policy Act (NEPA) and in California, the California Environmental Quality Act (CEQA)? Mining is just like every other business or commercial activity -- it must comply with the environmental law of the land. It carries the additional burdens of mining-specific regulations. *Bee* readers are led to believe that miners avoid those responsibilities. That assumption is absolutely false.

Recently, for example, a major mining company desired to conduct exploratory drilling on its mining claim. According to the *Bee*, the company simply would have wheeled into the property with a drilling rig, done what it wanted and left behind an unreclaimed site. That didn't happen and doesn't happen.

In fact, the company was told by the Bureau of Land Management that under the provisions of FLPMA it would not be allowed to drill on its mining claim, because such action would cause undue degradation on a sensitive site. The company pursued alternative technology -- ultimately securing permission to bring in the drill rig on a balloon-tire truck, traversing the ground covered with canvas. Water was hand carried in jugs, all signs of the drill hole were covered, drill mud remnants were carried out and even rocks were turned over to their original position. Will they be able to mine? There is absolutely no certainty that will occur.

In another location, a company has made application to develop a gold mine on the site of a former clay mine. The clay mine was developed prior to existing regulations and the open, unreclaimed pits are visually unattractive. The gold company is required to reclaim the area and leave it in a state which will be much enhanced visually. The company has spent millions of dollars on environmental studies and designing the mine to accommodate concerns, though it has yet to be permitted to mine.

Why were *Bee* readers not made aware of these types of examples of stringent regulation -- affecting companies holding important claims?

Why did *Bee* readers not have the opportunity to hear complaints that federal land managers -- particularly the Bureau of Land Management -- are excessive in requiring only the very highest and best technology for everything from exploration to developing mine impact mitigation? Why did *Bee* readers not hear of concerns that the entrepreneur, the prospector, will be eliminated from that traditional role by such regulations?

These are real and factual concerns.

Repeatedly the series asserts that mines are not required to reclaim. That is patently false. Reclamation is required, and in California bonding is mandatory on all Bureau of Land Management permits to mine. Reclamation requires that an area be left environmentally safe. Waste rock piles commonly are required to be masked, buildings removed, in the case of heap leaching all leach pads must be flushed, vegetation planted and numerous other requirements apply. At leading California mine sites voluntary, expensive innovative studies are underway to assess vegetation options, even though planting may be some years in the future.

Contrary to implications made by the *Bee* story, reclamation and backfilling of pits are not synonymous. For many reasons, filling in a pit may not be the best use of a formerly mined site. In some locations, former mine pits are being eyed by urban areas for sanitary landfills. Recreational areas and wildlife habitat refuges utilizing an empty pit are reclamation plans for other mines. And, modern operators with new technology often are able to re-mine a previously-mined location. Backfilling an open pit requires additional decades of energy use and industrial activity which may, in fact, lead to greater environmental impact than designing an alternative use for the open pit. To make such a judgement and attack the mining industry for failing to fulfill its obligations illustrates a woeful lack of information on industry practices.

It is particularly interesting that the series advocates a type of mining which by its name has been responsible for the greatest misconceptions about mineral extraction. In repeated references, the reporter advocates the same type of program that applies to coal mining. Facts will show that much coal is produced by strip mining. Its geology lies in a thick seam which when mined from the surface can be stripped away, and as mining moves forward the land is reclaimed behind it. That technique is not consistent with the geology which dictates other types of mining, such as the open pit method common in gold mining. There is no strip mining in California because the geology does not support it.

Similarly, charges concerning California's SMARA center on lack of funds to implement the program and carry out departmental services. Industry has worked with the Department of Conservation and Legislature to rectify those and other problems. But to charge that SMARA is not working is false.

In fact, to showcase reclamation accomplishments in California, awards have been presented to recognize such innovative second uses of mine land as the South Coast Botanic Garden in Los Angeles County. The awards also salute creativity in reclamation planning such as the proposal for the Merced River which will recontour the stream bed to resist floods and planting to improve wildlife habitat and salmon spawning. Another award-winning plan will create wetlands in the Los Banos area.

California is very zealous about its water quality. Rather than alleging by innuendo that mines are responsible for impairment of that resource, the series should have reviewed regulatory actions of state and regional water boards. Documenting compliance with Subchapter 15, Article 7 of the state water code would have shown the exacting standards, stiff penalties and impact of regulation on mine operators.

With great determination, the series purports to expose the antiquated workings of the 1872 Mining Law as both exploitive of national resources and unresponsive to environmental considerations.

Apparently for dramatic purposes, the series presents to *Bee* readers a picture of rampaging renegades living an Old West lifestyle as reflective of the common use of the Mining Law. Further, it characterizes the Bureau of Land Management as held hostage by this law, with no recourse against abuse. To equate that described activity with mining as an example of the 1872 Mining Law is akin to equating the publication of pornography with newspaper journalismas an example of the failure of the First Amendment. The latter argument is obviously specious. So is the first.

If the Bureau of Land Management is experiencing trespassers taking advantage of public lands by squatting on mining claims then it has a trespass and illegal occupancy problem -- not a mining law problem.

In fact, provisions of that law require that anyone living on a claim show why he or she is doing so -- and that living there be related to the operation of the mining claim.

In fact, the Bureau of Land Management can and does press mining claimants to prove the validity of claims. That validity test requires proof of both mineral value and financial ability to mine, process and market the mineral. Those thresholds are difficult to meet. A review of the Interior Board of Land Appeals cases of the last several years shows numerous cases where mining claims were invalidated.

In fact, according to the Solicitor's Office in Sacramento, as many as 15 improper claim holdings are prosecuted each year -- and the government usually prevails. According to that office, those cases are the extreme and many others are resolved at a lower level of activity. The Solicitor's office also reports recent successful criminal prosecution in a jury trial of an illegal occupancy case, incorporating charges of sanitation code and other violations of local law. That case has opened the door to an even more aggressive prosecution of such cases on the merits of the situation -- improper and illegal occupancy.

As expressed on many occasions, the mining industry does not take lightly any misuse of the mining law, as charged by one Bureau of Land Management ranger. When that ranger approached the California Mining Association's executive board he was treated courteously, the problem was aired and that board pledged its support -- there was never any suggestion that a change in the law would be necessary to accommodate the ranger's problems. Rather, it was suggested that he employ the same methods used elsewhere to successfully deal with trespass problems. Police powers for Bureau of Land Management rangers are relatively new. Authorization of those powers was not opposed by the mining industry. It appears that the agency's frustration with occupancy problems may reflect a lack of familiarity with eviction procedures -- which is much more to the point than problems with the Mining Law.

A General Accounting Office (GAO) report is quoted extensively as evidence of the shortcomings of the Mining Law. That report has been discredited in Congress, to regulators and across the country. The response "The Mining Law of 1872 DOESN'T Need Revision" by the American Mining Congress is in wide circulation and would have been an effective tool for the reporter in establishing balance on these issues.

In fact, the GAO report was prepared on the basis of a review of only 20 mineral patents issued since 1970 and 12 patent applications. In California, for example, though patents throughout the state are held by major mining companies, the GAO report surveyed only three sites held by individuals in the Mother Lode area. The extensive documentation in response to the GAO report would have been educational and informative to *Bee* readers. Unfortunately, they don't know the GAO report was ever challenged.

Conclusion

That the *Bee* could allow such misrepresentation, misinformation and dramatic errors to be presented with such graphic forcefulness is incredible. The examples quoted in this report simply are a few of the many allegations and assumptions presented as fact -- which apparently never were subject to verification or documentation.

The heart of the *Bee* series is discounting industry commentary as simplistic, defensive and unresponsive to contemporary concerns while showcasing critics, who are paid to oppose minerals extraction, as exclusively credible -- without qualifications, without historic or operational perspective and without acknowledgement of their political agenda.

The lack of perspective is particularly disquieting in this arena of public policy. Readers are, for example, subject to a vehement exercise in "foreign-phobia" with accusations about too great an influence from foreign-owned companies in the mining industry. There are foreign-owned companies in mining, as there are in real estate, automobile manufacturing and virtually every other aspect of our country's global economy. Many of those companies are publicly traded, with stock offered -- as in any other business -- to any consumer who wishes to become a shareholder.

In the same edition as this frenzied commentary were news stories about the dangers of the imbalance of trade. These "foreign-owned" companies pump billions of dollars into the American economy, employ Americans and provide exactly the "balance" to trade that experts say we must have to keep our system afloat.

As this series would have readers believe that mining is a tremendously lucrative, no risk, no problem undertaking, why was there no discussion about why more American companies aren't involved?

Mining is a complex, technological activity. While technical people may not be adept at sharing emotional generalities, there are many thoughtful, concerned industry representatives who did and would willingly have shared time with this reporter to provide a broad spectrum of opinion.

Perhaps the greatest disservice to *Bee* readers from this series was the equating of any hole in the ground with environmental degradation. Mining does have an impact -- minerals can only be taken from where they are located. They are located in the ground. They are produced to meet a market demand -- a demand reflected in virtually every aspect of American life. Americans and Californians deserve to be very proud that such production can occur in a means that is extraordinarily considerate of those inherent impacts.

The *Bee*'s vitriolic broadside was launched against the mining industry with little or no attempt to provide the balance that would have made it a strong public policy tool. The stories are filled with emotional, colorful anecdotes, without substance or fact. The series was a disservice to *Bee* readers, to a vital, responsible industry and to the general public.

STATEMENT

Oversight Hearing on Hard Rock Mining Reclamation and Bonding Practices

Senator Frank H. Murkowski

MR. CHAIRMAN, the mining industry is of critical importance to my State. The estimated value of Alaska's 1989 mineral production was $252 million, over twice the final value reported to the Bureau of Mines in 1988. Much of this gain is attributed to the lead, silver, gold and zinc output of the Greens Creek Mine located in Southeast Alaska. 1989 exploration expenditures were $45.8 million and development expenditures were up near $130 million. Eleven new mines started production in 1989.

These figures will continue to grow in number and in importance to Alaska as our oil revenues continue to decline and we turn to the development of our other vast and varied natural resources. Any of the changes this committee may make in mining law will have far reaching affects on Alaska's future.

So, I will listen with great interest to our panel today. It may be that we need some refinement in our mining law but we must keep in mind what our goal is. Any consideration of reform must include ways to revitalize our minerals industry by providing incentives, not creating obstacles, especially for the smaller companies. Today we should focus on how we can insure that public lands are reclaimed without placing burdens on miners to the extent that operations are not economically feasible.

Requiring financial guarantees has proven to be a very valuable tool for reclaiming mine sites. We can satisfy both the need to return closed mines to their natural state and the need to encourage the growth of our domestic mineral industry by setting up a realistic, balanced regulatory scheme. This balance is particularly critical to Alaska's mining industry. We are just in our infancy. The small and medium-sized mining operators comprise the whole industry. I am very concerned that any changes in mining law be sensative to their growth needs.

As I say so often, development of our natural resources and maintenance of a healthy environment are not mutually exclusive goals. We must strike a balance that allows our domestic mining industry to flourish to not only protect jobs and the envionment but our National security.

Thank you, Mr. Chairman.

Senator **Bingaman**. Before we start, I would like to take care of a few administrative details. I would ask the public witnesses to try to limit their oral remarks to no more than five minutes. The entire statements that have been prepared for the hearing will be included in the record. The hearing record will remain open for two weeks for additional comments and statements that people want to submit in writing. Members of the subcommittee may have additional questions that we will submit to the witnesses to be answered for the record.

The first panel is Mr. Cy Jamison, Director of the Bureau of Land Management here in Washington; Mr. Larry Henson, Associate Deputy Chief of the National Forest Service; and Mr. Hamlet Barry III, Executive Director of the Department of Natural Resources in Denver, Colorado.

Would those gentlemen please come forward and we will hear from each of you and then see if we have some questions.

Good morning—afternoon. Excuse me.

Mr. Jamison, why do you not begin?

STATEMENT OF CY JAMISON, DIRECTOR, BUREAU OF LAND MANAGEMENT, DEPARTMENT OF THE INTERIOR

Mr. **Jamison**. Thank you, Mr. Chairman. I will be brief as long as you put our entire statement in the record. I thank you for that.

I appreciate the opportunity to discuss contemporary administration of the mining laws and, in particular, to address BLM's bonding and reclamation practices. I will summarize pending recommendations for changes in our surface management program that will enhance the effective management of these laws.

I am committed to implementing administrative changes necessary to manage hard rock minerals more in harmony with other public land resources under current authority. In the past BLM's administration of mining laws has been mainly concerned with location, recordation and some patenting. In recent years we have been increasingly emphasizing surface management, including inspection and enforcement.

Since 1981 when BLM surface management regulations became effective, approximately 16,000 mine operations have been conducted on public lands. During that time BLM has been integrating management of hard rock mineral development with our other multiple use management resources under FLPMA. I have been actively involved in the transformation of the surface management program into a modern and viable component of the multi-use management mandate.

Before discussing the primary components of our surface management initiative, I would like to point out that almost all mining operators on public lands are good stewards, and they operate in compliance with all regulations and our management provisions. However, there are exceptions and room for improvement.

In the area of funding we have seen significant increases. In fiscal year 1982 BLM spent 10 percent of its appropriated funds for mining law administration on surface management activities. Today, in fiscal year 1991, we expect funding for administration for surface management program to exceed 40 percent.

Part of this increase is due to our action to recover cost of other portions of the programs, thus freeing appropriated funds for surface management. With this increase in funding we can further improve our administration of the surface management program. We are now inspecting not less than four times a year all producing operations using cyanide and inspecting other surface-disturbing operations twice a year.

We plan to implement a national policy on cyanide management, which includes better training for BLM personnel involved in cyanide management inspection. It is our intention that operators using cyanide will be required to limit public access, fence and net lethal cyanide solution ponds to prevent wildlife losses, monitor weekly unnetted ponds with sub-lethal doses and detoxify all ponds and flush all free cyanide heaps upon closure.

In concert with our Solicitor and the Department of Justice, I will review the Federal Government's liability for pre-1981 unreclaimed disturbance to see if a change in policy is needed. BLM will inventory the status of reclamation at all operations authorized since the inception of 1981 rules. We will review current reclamation practices to identify successful reclamation techniques which would be implemented at other mining operations.

BLM policy will require phased reclamation at existing active operations. No one will be permitted to move from one phase to the next without adequate reclamation. Until recently, our bonding policy has allowed the discretionary bonding of mining operations at the plan level—that is, operations disturbing more than five acres per year or in special areas. Operations below the plan level have not been required to be bonded unless there is a record of non-compliance.

We are committed to modifying the Bureau's bonding policy in the surface management program. Our goal is to implement a policy of mandatory bonding for all operations. We are working on the details of this new policy.

In my review of the bonding policy, I intend to take a close look at the state bonding to see if it is adequate and how BLM relates to it. My goals are these: (1) investigate and, if possible, expand acceptable types of financial instruments for bonding, (2) have a system that small operators can qualify for, and (3) bond all operations using cyanide.

I think these proposed policy and rule changes will have substantial benefits to the public. These initiatives will help build consistency in the surface management program and will increase environmental protection in mining law administration.

The reason I am taking such an active role in reclamation and bonding is to focus the policy debates on the mining law where they belong: self initiation, access, tenure and royalties.

The mining law does not need to be changed to address reclamation and bonding. I can handle those issues through administrative actions, including rulemaking and policy changes. We are taking steps to ensure that the administration of mining law better serves the public interest.

We look forward to working with Congress towards improved administration of mining activities on public lands.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Jamison follows:]

APR 19 1990

STATEMENT OF CY JAMISON, DIRECTOR, BUREAU OF LAND MANAGEMENT, UNITED STATES DEPARTMENT OF THE INTERIOR, BEFORE THE SUBCOMMITTEE ON MINERAL RESOURCES DEVELOPMENT AND PRODUCTION, COMMITTEE ON ENERGY AND NATURAL RESOURCES, UNITED STATES SENATE, ON RECLAMATION AND BONDING PRACTICES FOR HARDROCK MINERALS.

INTRODUCTION

I appreciate the opportunity to discuss with you contemporary administration of the mining laws. I will also summarize pending recommendations for changes in the Program that will further enhance the range of effective management tools available under present mandates and authorities. We will use these tools to manage the minerals subject to the mining laws in harmony with our other land and resource management responsibilities. I am committed to instituting administrative changes necessary to more fully realize the objectives authorized by current law.

Authority

Over the past quarter century operation of the mining laws has been significantly modified by enactment of a number of substantive environmental laws at both the Federal and State levels, including, at the Federal level the Clean Air Act, Federal Water Pollution Control Act, Solid Waste Disposal Act, Endangered Species Act and a host of others. In addition to and in furtherance of the objectives of these laws, section 302(b) of the Federal Land Policy and Management Act (FLPMA) directs the Secretary of the Interior to take any action necessary to prevent unnecessary or undue degradation of the lands. Section 603 of FLPMA mandates wilderness inventory and allows for continued mining operations that do not impair the wilderness suitability of a study area. The Congress expressly applied these directives to the mining laws. From 1976 to 1980 previous administrations struggled with the controversial task of developing the necessary regulations to implement this directive.

CURRENT REGULATIONS

The "3802 Regulations"

The regulations at 43 CFR 3802 pertain only to lands under wilderness study pursuant to FLPMA. In those areas, the operator must prevent undue and unnecessary degradation, provide for reclamation of areas disturbed and provide financial guarantees when deemed appropriate by the authorized officer. The filing of a plan of operations is required for all operations except for certain limited activities specified in the regulations and operations which possess "grandfather" rights under section 603 of FLPMA. Other public lands are subject to the regulations at 43 CFR 3809.

The "3809 Regulations"

The regulations at 43 CFR 3809 make use of tiered levels of increasing BLM involvement in operations for lands not subject to wilderness study. For all operations other than "casual use," the regulations require an operator to file with BLM either a "plan of operations" or a "notice". A plan of operations is required where the area of disturbance exceeds 5 acres. A notice is required if 5 acres or less will be disturbed. However, in designated wilderness areas, and certain other formally designated areas including areas of critical environmental concern, off-road vehicle closures, and actual or potential additions to the Wild and Scenic Rivers Systems, a plan of operation is required to be filed for all surface-disturbing operations, except casual use, to ensure proper site reclamation. In all cases the operator must prevent unnecessary or undue degradation, provide for reasonable reclamation, and post necessary financial assurances when deemed appropriate by the authorized officer.

Until recently the policy that guides implementation of our bonding provisions has been to allow for discretionary bonding of actual mining operations at the plan level. Exploration operations at the plan level have not been required to be bonded unless there is a record of noncompliance. Our regulations permit the authorized officer to accept a State reclamation bond in lieu of requiring the operator to post an additional bond with BLM. This policy of discretionary bonding has been changed and we are now in the process of formalizing the changes. The new policy calls for mandatory bonding for plans of operations. We are studying the notice level to see what types of financial guarantees might be appropriate in these limited situations.

Administration

For operations resulting in disturbance of more than 5 acres, BLM requires periodic inspection to follow up on each plan of operation authorized under 43

CFR 3809 to ensure that the operation is in conformance with the plan of operations. For operations of 5 acres or less proceeding under a notice filed under 43 CFR 3809 we require periodic inspections to ensure that unnecessary or undue degradation is not occurring and that reclamation is occurring. Operators are required to notify BLM when all reclamation is completed.

In the eight years that the surface management program has been in operation on BLM administered lands, approximately 16,000 operations have been conducted on public lands. These operations not only require BLM administration, but are subject to a broad spectrum of other Federal, State and local permits and substantive requirements. The cooperative efforts of State and local governments, mining associations, individual operators and BLM and other Federal agencies have been successful in reducing to minimal levels the impacts to the public lands.

Cooperation with States

Our regulations encourage creation of joint State and Federal programs of cooperation for enforcement and administration of the program. In implementing the regulations, BLM's task was to gain the cooperation of the user groups and make the surface management program as mutually beneficial as possible to BLM, the user groups and the non-Federal agencies. The BLM State Offices were instructed to seek cooperative agreements with State mining and reclamation agencies to create a single point of contact for approval of operations and to create joint inspection and compliance programs.

Initially, seven cooperative agreements were consummated with the States of Washington, Oregon, Idaho, California, Colorado, Wyoming and Montana. A partial agreement covering bonding was consummated with Utah. There is a "master" agreement with the California Surface Mining Board which has overall direction of the State program, but the program is decentralized to the counties. Agreements have been negotiated with some of the counties. In most of the agreements, bonds to be posted pursuant to State authorities are held by the State.

Currently the cooperative agreement with the State of Washington has expired and has not yet been renewed. The Utah State Office is in the process of implementing a comprehensive agreement with the State of Utah. Partial agreements or informal procedures covering exchange of information that affects limited aspects of operations are in place in Arizona and Nevada. A comprehensive agreement between Nevada and the BLM is currently being negotiated.

SURFACE MANAGEMENT INITIATIVE

With enactment of the various environmental laws I mentioned and the development of the NEPA process, BLM's administration of the mining laws has changed, particularly since enactment of FLPMA. Since that time, BLM has been developing and refining an approach to fully integrate management of hardrock mineral development with our other resource mandates.

Since my confirmation, I have been actively involved in the transformation of this minerals program into a truly contemporary component of our multiple use management authorities. These actions, along with those initiated by my predecessors, include:

- Increased funding.
- Increase in number and detail of inspections at operations and in documentation.
- Adoption of a national cyanide management policy.
- Evaluation of the extent of unreclaimed pre-rule disturbance.
- Review of reclamation activities at all operations approved since the inception of the 1981 rules.
- Changes in the bonding policy and the surface management rules.

Until the last few years administration of the mining laws has been primarily concerned with location, recordation, and some patenting. Now our management of the law encompasses increased emphasis on surface management, including inspection and enforcement. Let me discuss briefly each of the primary components of this surface management program.

I should point out that most operators on the public lands under the mining law are good stewards of the land and operate in accordance with the provisions of BLM's surface management regulations. Nonetheless, the additional requirements and monitoring we have instituted will further assure the public of the good faith of all parties and improve our ability to administer the program.

Increased Funding

Consistent with the Administration's views on cost recovery, we determined through analysis that new fees were warranted in the mining law program. The BLM promulgated rules raising existing filing fees and imposing new filing fees upon claimants with unpatented mining claims on public lands to offset the cost of related portions of the program. The new fee structure was effective January 3, 1989. The fees are collected to cover the costs incurred by the BLM for processing location notices, amendments, annual filings, and transfers of interest for unpatented mining claims.

Funding for the surface management program has increased dramatically since FY82 when regulations for surface management were promulgated. In FY82, the BLM spent approximately 10 percent, or $535,000, of its appropriated funds for mining law administration on surface management activities. In FY89, that figure was approximately 30 percent or $3.3 million. For FY90, with the concurrence of the Administration and Congress, appropriated funds previously used for recordation were retained and redirected toward a variety of new surface management activities. This is a direct benefit of the new fee structure and authority to use these fees for administration. At this time, the BLM expects funding for surface management will exceed 40 percent of appropriated funds in FY90. We expect much the same trend to continue in FY91.

Frequency and Detail of Inspections and Documentation

We implemented a new policy requiring more frequent inspections on October 24, 1989. Under this policy BLM will inspect all producing operations using cyanide not less than 4 times a year. We will inspect all other surface disturbing activities twice a year. Each inspection will examine operations to determine compliance with notices and plans and to ensure reclamation requirements are being met. Results of inspections will be compiled in automated records and kept for the life of each operation.

We have also set new standards for documenting inspections and will ensure information transfer among offices for program consistency.

National Cyanide Management Policy

We are developing policy on cyanide management that sets forth necessary and required actions for all cyanide operations. We expect to utilize existing State and Federal programs that regulate cyanide when considering and approving plans of operations or reviewing notices.

We are planning to require operations using cyanide to-

- Fence and close the operation to limit public access.
- Fence and net lethal CN solution ponds to prevent wildlife losses.
- Monitor weekly unnetted and unfenced ponds with sub-lethal cyanide.
- Detoxify all ponds and flush all free cyanide from heaps upon closure.

BLM will --

- Establish informal groups of experts from BLM personnel who will be knowledgable in this area.
- Develop an external link to cyanide technology expertise.
- Improve data gathering and record keeping to assure identification and availability of all pertinent information on a case by case basis.
- Coordinate with other Federal agencies, including EPA, and with State governments in development and implementation of this aspect of our program.

Our cyanide management policy will also address training and expertise needed by BLM inspection personnel.

Pre-Rule Unreclaimed Disturbance

In concert with our Solicitor and the Department of Justice, I will review the Federal government's liability for unreclaimed areas to determine whether a change in policy is needed.

Review of Post-Rule Reclamation

BLM will inventory the status of reclamation at all operations authorized since the inception of the rules and will review current reclamation practices to identify successful reclamation techniques.

BLM policy will require concurrent reclamation at existing active operations. By concurrent reclamation, we mean a "staged" or phased reclamation will be required. Through the plan approval process, we will assure that no one is permitted to move from one phase of operation to the next without adequate reclamation performance at that stage. We will review operations on a continuing basis, to evaluate reclamation success.

Change in bonding policy and rules

We are committed to modifying the Bureau's bonding policy in the surface management program. While the bonding of both exploration and mining operations continues to be a vexing question, our goal is to implement a policy of mandatory bonding for all operations. We are working on the final details of the new policy. In establishing this policy we must consider:

- The various State methods of bonding and their adequacy
- How we related to State bonding requirements
- Availability of bonds for reclamation purposes
- Expansion of financial instruments available for bonding
- Assurance that small operators can qualify
- Bonding of all cyanide operations

Thus, during the review, we will have taken into consideration the various State methods of bonding, whether a bond pool is available, what levels of protection are needed, whether there should be bond caps, and whether there should be double bonding.

CONCLUSION

I think these proposed policy and rules changes will have substantial benefits to the public. Our objective is to minimize the administrative costs of bonding notice level operations and the burden on the mining public, while assuring that financial guarantees will be in place for all notice and plan level operations. The initiative will help build consistency throughout the national program and will increase the degree of environmental protection in mining law administration.

The reason I am taking such an active role in this matter is because I want to focus the policy debates on the mining law where they properly belong -- that is, self initiation, tenure, access and royalties. The Administration is committed to fully pursuing administrative actions for bonding and reclamation under current law.

This concludes my statement. Thank you for your continued interest in furthering the objectives of encouraging beneficial mineral development within a framework of appropriate environmental safeguards and surface management. We all share these goals.

I will be glad to answer your questions.

Senator **Bumpers** [presiding]. Mr. Henson.

STATEMENT OF LARRY HENSON, ASSOCIATE DEPUTY CHIEF, NATIONAL FOREST SYSTEM, FOREST SERVICE, DEPARTMENT OF AGRICULTURE

Mr. **Henson**. Thank you, Senator Bumpers. I will summarize my statement for the record.

Forest Service has the responsibility to manage the occupancy and use of the surface of National Forest System land by persons conducting hard rock mining activities pursuant to the General Mining Law of 1872 as amended. Our regulations describe requirements for reclamation and bonding that ensure mining activities are conducted in such a way as to minimize adverse environmental impacts on National Forest System resources.

Under our regulations, persons proposing to conduct mining operations on National Forest System lands that might cause significant disturbance of surface resources must prepare and submit a plan of operations for approval before they begin. Persons proposing to mine may also be required to post financial guarantees to ensure that any significant surface disturbance will be reclaimed should the operator fail to do so.

Our regulations were issued in 1974 and have proven to be effective in protecting the National Forest System against unnecessary or unreasonable damages from operations carried out under the mining law of 1872.

The substance of the regulations has withstood legal challenges over the years. We believe the existing regulations have protected National Forest System resources without unreasonably restricting the activities of prospectors and mine operators.

Under our regulations, mine operators must file a plan of operations for any mining activity that could result in significant surface disturbance. The plan of operations describes the entire mining operation, including equipment, location of access routes, port facilities, drill sites and reclamation plans. Individual miners and the industry as a whole have been cooperative in working within approved plans of operation. In rare cases, we have taken legal action to ensure compliance.

Mine operators may be required to post financial guarantees to ensure that mining operations likely to create significant surface disturbance are reclaimed. Financial guarantee allows the Forest Service to carry out reclamation activity if the operator fails to do so.

Our field officials review the operator's plan of operations, determine the likely degree of surface disturbance and set the amount of the financial guarantee accordingly. Where only minimal disturbance is anticipated, the authorized officer may determine that no financial guaranty is necessary, although reclamation of the mine site is still required.

Financial guarantees and bonds have been effective incentives in ensuring that mine operators reclaim disturbed lands. Approximately 85 percent of our plans of operation are covered by financial guarantees.

We believe that the mining industry supports the need to reclaim mined Federal land and the need for financial guaranties to ensure reclamation. Industry representatives have stated that our requirements for financial guarantees are usually applied in a fair and reasonable manner. We are not aware of any instances where mine operators abandoned plans to develop a mine because we required them to post a financial guarantee to ensure reclamation.

However, we are aware that some small mine operators have difficulty obtaining financial guarantees in the form of surety bonds. Our regulations allow for the acceptance of various types of financial guarantees other than surety bonds. These include the posting of cash, irrevocable letters of credit, signed certificates of deposits and assigned savings accounts. This flexibility allows mine operators to choose the types of guarantee most compatible with their financial situation while protecting the government's interest.

The General Accounting Office has conducted two audits in recent years examining Forest Service reclamation and bonding practices. Also, in 1987 we conducted our own internal review of reclamation practices, which resulted in improvements in our own administration. We believe the GAO and our own reviews indicate we have a successful reclamation program.

That concludes my statement. I would be happy to answer questions.

[The prepared statement of Mr. Henson follows:]

STATEMENT OF
LARRY HENSON, ASSOCIATE DEPUTY CHIEF
NATIONAL FOREST SYSTEM
FOREST SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

Before the
Subcommittee on Mineral Resources Development and Production
Committee on Energy and Natural Resources
United States Senate

Concerning Reclamation and Bonding Practices Associated with Hardrock Mining on National Forest System Lands

April 19, 1990

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE:

Thank you for the opportunity to provide information about reclamation and bonding practices associated with hardrock mining operations on National Forest System lands.

As you are aware, the Forest Service has the responsibility to manage the occupancy and use of the surface of National Forest System land by persons conducting hardrock mining activities pursuant to the General Mining Law of 1872, as amended. Our regulations (36 CFR 228, Subpart A) prescribe requirements for reclamation and bonding and were promulgated to ensure that mining activities are conducted in such a way as to minimize adverse environmental impacts on National Forest System resources.

Nine of the twelve western States (California, Colorado, Idaho, Montana, Oregon, South Dakota, Utah, Washington, and Wyoming) have reclamation requirements and bonding authorities that cover surface impacts from hardrock mining on Federal land. The remaining three states (Arizona, Nevada, and New Mexico) do not have such reclamation requirements, but rely on other State laws and regulations to control impacts associated with hardrock mining.

The Forest Service cooperates with many of these States in the administration of reclamation and bonding through Memoranda of Understanding that are designed to reduce financial burdens to mine operators and to avoid duplication of bonding by the various government entities.

RECLAMATION AND BONDING REGULATIONS

Under our regulations, persons proposing to conduct mining operations on National Forest System lands that might cause significant disturbance of surface resources must prepare and submit a plan of operations for approval before they begin. Persons proposing to mine may also be required to post financial guarantees to ensure that any significant surface disturbance will be reclaimed, should the operator fail to do so.

The regulations were issued in 1974 and have proven to be effective in protecting the National Forest System against unnecessary or unreasonable damages from prospecting, exploration, development, mining, and/or processing operations carried out under the Mining Law of 1872. The substance of the regulations has withstood legal challenges over the years, but our experience in administering them have highlighted several administrative problems and questions about the access provisions. We currently are drafting revisions to the regulations to resolve these issues.

Despite these concerns, we believe that the existing regulations have protected National Forest System resources without unreasonably restricting the activities of prospectors and mine operators.

Specifically, the provisions of 36 CFR 228, Subpart A, require mine operators to file a plan of operations for any mining activity that could result in "significant surface disturbance." In general, operations using mechanical earth-moving equipment or surface explosives are considered to cause "significant disturbance." Pick-and-shovel operations or underground explosives (unless caving-in of the surface would result) are normally not considered significant. Almost without exception, road and trail construction and tree-clearing operations cause significant surface disturbance. The plan of operations describes the entire mining operation, including equipment, location of access routes, support facilities, drill sites (to the extent possible), and reclamation plans. Based on a review of the plan, authorized Forest Service field officers make the determination of what is significant on a case-by-case evaluation of the specific proposed operations, the types of lands, and other surface resources involved.

Individual miners and the industry as a whole have been cooperative in working within approved plans of operation. In rare cases, we have taken legal action to ensure compliance, through criminal citations under our regulations (36 CFR 261.10) or through civil action.

Mine operators may also be required to post financial guarantees to ensure that mining operations likely to create significant surface disturbance are reclaimed. The financial guarantee allows the Forest Service to carry out reclamation activity if the operator fails to do so. Our field officials review the operator's plan of operations, determine the likely degree of surface disturbance, and set the amount of the financial guarantee accordingly. Where only minimal disturbance is anticipated, the authorized officer may determine that no financial guarantee is necessary, although reclamation of the mine site is still required.

Financial guarantees and bonds have been effective incentives in ensuring that mine operators reclaim disturbed lands. Approximately 85 percent of our plans of operation are covered by financial guarantees. Operations that are not insured by financial guarantees include those that involve minimal surface disturbance where only minimal reclamation activities are necessary to ensure reclamation.

We believe that the mining industry generally supports the need to reclaim mined Federal land and the need for financial guarantees to ensure reclamation. Industry representatives have stated that our requirements for financial guarantees are usually applied in a fair and reasonable manner. We are not aware of any instances where mine operators abandoned plans to develop a mine because we required them to post a financial guarantee to ensure reclamation.

However, we are aware that some small mine operators have difficulty obtaining financial guarantees in the form of surety bonds, because many insurance companies will not bond small mine operators unless they provide substantial collateral. Our regulations, policies, and instructions allow for the acceptance of various types of financial guarantees other than surety bonds. These include the posting of cash, irrevocable letters of credit, assigned certificates of deposit, and assigned savings accounts. This flexibility allows mine operators to choose the types of guarantee most compatible with their financial situation while protecting the Government's interest.

RECENT REVIEWS OF FOREST SERVICE RECLAMATION AND BONDING PRACTICES

The administration of reclamation activities is a dynamic process. We continue to seek methods of improving our management of mining operations. In October 1987, the Forest Service completed a nationwide review of reclamation activities on National Forest System lands. The emphasis was on current operations, not abandoned mine lands. The objectives were to evaluate the following reclamation activities: (1) standards; (2) research; (3) planning; (4) interagency coordination; and, (5) workforce. A goal of the review was to identify innovative, efficient methods and procedures for possible implementation.

This review also evaluated our administration of the requirement that mine operators post financial guarantees. This included analyzing the procedures for releasing financial guarantees and evaluating the possibility that the Forest Service and other Federal or State agencies imposed duplicative requirements for financial guarantees.

Following this internal review, the Forest Service implemented a plan that included actions to:

1. Add a new chapter (FSM 2840) to the Forest Service Manual dealing with reclamation to strengthen National direction and standards;

2.- Provide training in the use and calculation of financial guarantees at all levels, so that those procedures are more clearly understood;

3. Establish new standards for reviewing and updating financial guarantees to reflect changes in on-the-ground conditions and in reclamation costs; and

4. Review procedures for the use of financial guarantees among State agencies, other Federal agencies, and the Forest Service to avoid duplication and reduce financial burdens to mine operators.

We are confident that these measures will help us continue to improve the management of hardrock mining operations on National Forest System lands.

Two audits by the General Accounting Office have examined Forest Service reclamation and bonding practices. One, entitled "Ensuring Against Abuses from Hardrock Mining" (GAO/RCED-86-48), compared Forest Service reclamation practices with those of BLM. The other, "Financial Guarantees Encourage Reclamation of National Forest System Lands" (GSO/RCED-87-157) concluded that: (1) financial guarantees provide incentives to miners to reclaim mineral sites; (2) financial guarantees do not prevent operators from mining; and, (3) Forest Service officials work effectively with mine operators to develop plans that minimize reclamation costs and, in turn, the amount of financial guarantee needed.

We believe that our own and other reviews indicate that we have a very successful program.

That concludes my prepared statement. I would be happy to answer your questions.

Senator **Bumpers**. Thank you Mr. Henson.
Mr. Barry.

STATEMENT OF HAMLET J. BARRY III, EXECUTIVE DIRECTOR, COLORADO DEPARTMENT OF NATURAL RESOURCES

Mr. **Barry**. Thank you, Senator Bumpers. You have now heard from the two Federal bureaucrats. I suppose I am here because Colorado was presumably a typical western state and we have about 15 years of experience with the reclamation laws, and perhaps you would like to balance our experience versus the Federal experience and see what you come up with.

Let me describe for you, if I might, without reading my prepared statement, what Colorado's history has been, how our law works, and what our problems are and how we coordinate with these two guys to my right.

There are about 2,000 mining operations in Colorado subject to the Colorado Mine Land Reclamation law which was passed in 1976. About 75 percent of those operations are sand or gravel or aggregate. Depending upon how you classify and what you mean by "hard rock," there are probably 300 to 400 hard rock mining operations in Colorado today, active operations. About 75 of those are on Federal land.

The Colorado Mine Land Reclamation law was passed in 1976. It predates BLM's Surface Management Regulations. I think it predates some of the regulations that Mr. Henson was speaking of from the Forest Service. It applies to all land in the state of Colorado, that is, Federal, state, local land, any variety, our law applies to it, as we think it should apply to any land in the state.

Our law establishes a reclamation scheme for an operator. It has performance standards in it. It requires the operator to create a final topography that is appropriate to the final land use, to protect drainage systems from acid forming or toxic-producing material, to salvage top soil, to revegetate and to minimize disturbance to the quality and quantity of water at the surface and in the ground. And it requires you to reclaim the land so that you have a useful, final, beneficial use for the land.

In contrast, let me say that that is a little different than the requirements in the Federal Coal Mining Law, the SMCRA, which, for example, requires that you return the land to the approximate original contour. We have a law that is simpler in its application. It requires an appropriate final topography with a beneficial land use. It does not require approximate original contour That is good or bad depending on your point of view. But it does make a difference in what it cost to reclaim.

In order to get a mining permit in Colorado, you have to file a permit and you have to show, in detail, what you are going to do and how you are going to do it. You have to show how your plan to mine and reclaim will meet the requirements of the law. That includes a description of the mine plan, the amount of soil available for reclamation, the shrubs or trees that will be used, the grade and stability of the mining slopes, the measures to protect water quantity and quality, and other technical information.

We do require that an applicant provide enough detail to us so that we can actually compute, using engineering methods, what the cost will be to the state if they fail to reclaim the land as proposed and approved in their mining permit. We set the bond amount according to the actual cost of doing the work—should they fail, what the cost will be to the state to do that work.

One of the weaknesses in Colorado's law, I will tell you frankly, is that for operations of less than 10 acres there is a $5,000 bond ceiling that has created some problems in Colorado. I will be quite frank about that. That is not enough money in some cases.

For operations above 10 acres there is no limit on the amount of the bond. Colorado holds bonds for mining operations. Our total amount of bonds that we hold is in excess of $200 million. Of that $200 million in bonds, we have seen default in about 30 of the 2,000 bonds that we hold. The size of our bonds ranges from $500 to about $30 million. We have a default rate of less than .5 percent, but we do have some defaults and some forfeitures. Bonds are a problem in Colorado for small operators.

We have found in Colorado that characterizing the cost of reclamation on a per acre basis is not a very useful way to approach the problem. It is much better to calculate the actual cost.

We pay special attention to cyanide heap and dump leaching, cyanide mining. Cyanide solution mining is at least a public perception problem in Colorado. We pay extra attention to those operations and we have a different bond ceiling for cyanide operations. If you are under 10 acres and you are a cyanide operation, your bond ceiling is $20,000, not $5,000. If you are over 10 acres and you are a cyanide operation, again, you have no limit to the amount of bond.

There are a number of other environmental laws that operators have to comply with in Colorado, particularly as to water quality and hazardous materials. Those are taken care of either by my agency or by the State Health Department in cooperation with EPA.

Finally, I just reference the fact that Colorado has existing memoranda of agreement with both BLM and the Forest Service dating from the early 1980s. Those documents are in place because we want to avoid duplication of effort between our agencies and the application of reclamation requirements for mining on Federal land. By and large, I think those arrangements have worked reasonably well. What they do, is make sure that an operator does not get hit with conflicting reclamation requirements, and they make sure that an operator does not have to bond, have two agencies holding a bond to do essentially the same task.

In most cases with both BLM and the Forest Service, our law is either more detailed or more stringent than the BLM or Forest Service regulations. So we are doing most of the actual work. In many cases we are doing joint inspections of mining operations, particularly with BLM. We find that those arrangements have worked pretty well. They may not be perfect, but we think they are generally acceptable.

I guess finally, I would say in closing, our biggest problem in Colorado is not with existing mines. We think we have a pretty good handle on existing mines. We have a lot of problems with previously mined and abandoned properties. We did an inventory in Colorado about 10 years ago. We have at least 9,000 previously mined and abandoned sites in Colorado. Some of those are dangerous, and we lose about five lives per year of children and people falling into holes and going into mine shafts. We are closing those at a rate of about 600 per year using the abandoned mine land funds available through the SMCRA law, 50 percent of which are rebated to the state of Colorado.

Our biggest problem with reclamation, we think, is not existing operations, but with previously mined and abandoned sites. If I were to make an appeal to Congress, it would be for help in that area. We are getting about $2 million per year from our 50 percent rebated money through AML. We are using that money, as I say, at a rate of about 600 closures per year to close previously mined and abandoned areas. That is our biggest problem.

We think we are working reasonably well with the two Federal agencies, and we think our state law, while it is not perfect, it gives us the flexibility that we need to control these problems.

With that, I think I will end my formal testimony and also make myself available for questions. Thank you.

[The prepared statement of Mr. Barry follows:]

STATE OF COLORADO ROY ROMER, Governor
DEPARTMENT OF NATURAL RESOURCES
HAMLET J. BARRY III, Executive Director
1313 Sherman St., Room 718, Denver, Colorado 80203 866-3311

Geological Survey
Board of Land Commissioners
Mined Land Reclamation
Division of Mines
Oil and Gas Conservation Commission
Division of Parks & Outdoor Recreation
Soil Conservation Board
Water Conservation Board
Division of Water Resources
Division of Wildlife

Testimony of
Hamlet J. Barry III
Executive Director
Colorado Department of Natural Resources
Before the
Mineral Resources Development and Production Subcommittee
of the
Committee on Energy and Natural Resources
United States Senate
Concerning
Reclamation and Bonding of Hard Rock Mining Operations In Colorado

April 19, 1990

I want to thank you for the opportunity to present testimony on this very timely and important topic; reclamation and bonding of hard rock mining operations. I will describe to you today the Colorado regulatory program which requires all mining operations, except for coal mining and reclamation operations which are regulated separately, to reclaim the land disturbed by mining and to post a financial warranty (bond) with the state.

There are over two thousand mining operations in Colorado subject to the Colorado Mined Land Reclamation Act. Approximately 75% of those mines are sand, gravel and aggregate operations. Depending upon what type of mineral an individual classifies as "hard rock", there are between 300 to 400 hard rock operations in Colorado. There are approximately 75 active operations on federal lands.

The Colorado Mined Land Reclamation Act was passed in 1976. That Act was preceded by other reclamation statutes in the state, but was the first comprehensive statute. The Act applies to all lands in the state and is administered by the Colorado Mined Land Reclamation Board and Division. The Board is a multi-interest citizens body which is appointed by the Governor and oversees the activity of the Division. The Board promulgates rules and regulations, hears appeals of Division decisions, grants or denies permit applications, initiates enforcement actions, and performs other administrative and adjudicatory duties.

The Act establishes performance standards for all non-coal mining operations. The performance standards require a hard rock mining operation to create a final topography appropriate to the final land use, to protect drainage systems from acid-forming or toxic-producing material, to salvage topsoil, to revegetate, to minimize disturbance to the quality and quantity of water in surface and ground water systems, to stabilize all areas to control erosion, and, generally, to reclaim the land through these and other measures so that after mining the land can be put to a beneficial use.

Before a mining operation can commence, the operator must obtain a permit from the Mined Land Reclamation Board or Division. In order to obtain a permit an applicant must demonstrate that the post-mining land can be put to beneficial use. The applicant has to describe in sufficient detail how the proposed operations will conform to the reclamation performance standards set forth in the statute regulations. This includes a description of the mine plan, the amount of soil available for reclamation, the grass, shrub or tree species that will be used for revegetation, the grade and stability of the post-mining slopes, the measures to be used to protect water quantity and quality and other technical information.

The permit application must also provide sufficient detail so that the cost of reclamation can be calculated to determine the amount of financial warranty. Under the Act only the state can hold a financial warranty for reclamation. We have an agreement with federal land management agencies where we hold the financial warranty for operations on federal lands. For operations that are ten acres or larger, the amount of financial warranty must be sufficient to cover the cost that the state would incur if it had to reclaim the land. For operations less than 10 acres, the amount of financial warranty that can be required is capped by statute at $5,000, which leaves the state with insufficient financial warranty in many cases. Operations affecting less than two acres of land are required to post a financial warranty of no more than $1,500.

With regard to small operators, the financial warranty requirement is a serious issue in Colorado. Small operators find it difficult to post financial warranties. Most warranties in small amounts are posted with certificates of deposits or other forms that require assets to be pledged by the operator. This puts a strain on the small operators resources. On the other hand, small operators are most at risk of defaulting on their reclamation obligations, and an insufficient financial warranty leaves the state without adequate funds to complete the reclamation. I think this issue will be reviewed in the near future to develop alternatives to ensure that reclamation will be completed at small operations.

The Division calculates the amount of financial warranty using an engineering cost estimating method to establish the actual cost of moving dirt, planting seeds, removing structures, etc. Experience has found that this method is quite accurate and assures that adequate funds will be available for reclamation of large operations. We have found that characterization of the cost of reclamation on a per acre basis is misleading and inappropriate for calculation of the amount for financial warranty.

The Colorado Mined Land Reclamation Act provides for enforcement of both permit terms and statutory requirements. This includes the authority to revoke permits, forfeit financial warranties, issue cessation orders and notices of violation and assess civil penalties.

Currently there are 30 sites in Colorado where the permit has been revoked and the financial warranty forfeited. Most of those sites are small operations where the amount forfeited is not enough to complete the reclamation as planned.

Cyanide heap and dump leaching, vat leaching and mill circuits have received considerable attention in recent years as a profitable way of recovering gold. Although we believe that such operations can be designed and engineered to protect the environment and reclaimed, they evoke considerable opposition in some communities. Some of the community concerns are warranted where such operations in the past have been poorly executed and maintained. During our review of the permit applications we require the applicant to demonstrate that the solutions can be totally contained, that leak detection systems are in included, that waste material and heaps are detoxified and that other safeguards are implemented which ensure that the environment is protected during mining and that the facility can be reclaimed. The financial warranty cap for cyanide operations less than 10 acres in size is $20,000 as opposed to the $5,000 for other small operations.

Most problems with cyanide operations, as well as other types of operations, have been corrected through the inspection, enforcement, revocation and warranty forfeiture processes.

In addition to the Colorado Mined Land Reclamation Act, mine operators must comply with other state environmental laws pertaining to water quality and air quality protection. The relationship between the Colorado Mined Land Reclamation Act and these other laws is complimentary. With respect to water quality, the state Water Quality Control Commission sets standards and classifications for all waters of the state. These standards are implemented through the mined land reclamation program, with the exception of point source discharge permits. Point source discharge permits must be obtained from the Water Quality Control Division. The state has had classification and standards for surface waters for several years. The standard setting and classification for ground water is in the initial stages of development.

Colorado works cooperatively with the Bureau of Land Management (BLM) and the United States Forest Service (USFS) to regulate operations on federal lands. The Division has executed agreements with both agencies to coordinate activities. The agreement with the USFS allows for the state to hold the financial warranty and to be primarily responsible for the administration of the reclamation work. The USFS notifies the Division if an operator fails to meet their requirements. Before a financial warranty is released by the state, the USFS advises the Division whether the work has been completed in a satisfactory manner. If the USFS believes that the financial warranty posted with the state is inadequate, it can require additional warranty to be posted with them. The agreement was executed in 1982, and we recently sent a letter to the Forest Service suggesting that we jointly determine if it needs updating.

The agreement with the BLM was executed in 1984. The agreement provides for the Division to assume primary responsibility for reclamation of prospecting and mining operations and prescribes a process for the exchange of information about applications and on-going operations. Under the agreement, permit applications will be denied by the state where the BLM advises the Division that the operation would be contrary to Federal law. We have conducted joint inspections with BLM and taken enforcement actions, under the terms of the agreement, which have satisfied BLM obligations.

Our most significant reclamation problem in Colorado is with inactive and abandoned mines. Several thousand unpermitted old mine sites pose a threat to human health and safety and continue to degrade the environment. We are safeguarding as many of those sites as we can through our Inactive Mine Reclamation Program, and where appropriate, we are reclaiming sites through the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). However, neither of these efforts are adequate to fully address the problem. The Inactive Mine Reclamation Program is funded through Title IV of Surface Mining Control and Reclamation Act (SMCRA), focuses on reclamation of abandoned coal mines, is not sufficient to address all the old hard rock mine hazards, and cannot, at this time, be used to correct environmental problems. CERCLA is unwieldy and is a completely inappropriate tool for the correction of many environmental problems associated with inactive and abandoned mines. The risk of significant liability under CERCLA has deterred clean up of old sites by capable mine operators who would like to remine property.

Some new tools for reclaiming old hard rock mines need to be developed. Tools that provide for the reclamation through a non-coal abandoned mined lands program, and that provide incentives for the private sector to take on the responsibility for cleaning up old sites through remining. One possibility, H.R. 2095, sponsored by Representative Rahall, was passed by the House of Representatives during this Congress and is now pending in the Senate. H.R. 2095 contains amendments proposed by Representative Ben Nighthorse Campbell that would create a non-coal abandoned mine reclamation program. The bill needs to be amended to provide an adequate funding source, and it should be given serious consideration as a means for addressing the inactive and abandoned lands problem.

In addition, the Western Governors' Task Force on Mining Waste is beginning a study to determine the scope of the national non-coal abandoned lands problem. The idea is to bring together the various inventories and independent sources of information to better define the size and nature of the problem, and to examine whether a national policy is needed to clean up abandoned and inactive non-coal mines. The task force intends to complete the work by May of 1991.

Finally, I presume that this Subcommittee may be asked to propose national legislation for reclamation of all mining, as a companion to the surface mining control reclamation act passed in 1977 or as a component of an EPA RCRA program. From our point of view, we think this would be inadvisable. By and large, the Colorado Reclamation Program has been a success. Where we have made mistakes, or failed to accommodate a new practice or procedure, we have been able to change our law or regulations appropriately.

The law has proven to be effective, and compared to OSM and the national coal reclamation standards, relatively inexpensive to administer. Our experience with federal mining regulations over the last 13 years has been that the law and regulations were usually written with West Virginia or Pennsylvania in mind, and the administrators of the program did not understand or concern themselves with coal mining conditions in the West. The coal law does provide for better reclamation than the Colorado reclamation law for non-coal mining, particularly in some areas involving hydrology, and by providing that the land must be regraded to the approximate original contour. However, these advances are made at an extremely high bureaucratic cost, and at considerable expense to the operator. The federal coal reclamation law has effectively ended mining of coal by small operators in Colorado. I have no doubt that a similar federal standard for non-coal mining or a new EPA-driven program, would do the same for hard rock mining in Colorado, thus bringing to an end a long chapter of exploration, development, and production of hard rock mining in Colorado.

Thank you for the opportunity to testify. If you have any further questions, I would be happy to respond.

0259A

Senator **Bumpers**. Thank you, Mr. Barry, Mr. Jamison, and Mr. Henson. I have a number of questions here. I may submit some of them for the record later, but I would like to get into some of them. I am trying to accomplish such a comprehensive change with my mining reform bill, I hardly know where to begin on this facet of it.

The environmental and reclamation concerns are not the reason I got involved in the Mining Law. I got involved because I thought it was bizarre that we allowed people to walk onto Federal lands, BLM land, and Forest Service lands and stake a claim and later if they find anything, start mining it without being required to pay any royalties to the United States Government for anything they took. Silver and gold mining are big business in California and Nevada right now on Federal lands, and the United States Government may not have even gotten a bond that the land will be reclaimed but, more importantly they do not get a dime in royalties.

And, in addition to that, some of these people can apply and often do make an application for a deed on the land and get the land for $2.50 to $5 an acre based on a law that General Grant signed when he was President. And that just seems so outrageous to me, that piqued my curiosity.

But now, we go to the second phase of my concerns, and that deals with the bonding and reclamation. And, as I have gotten more deeply involved in that—and I have to tell you in all candor—and I know this will not come as a shock to a single person at the table or in the audience—I have a very, very strong feeling that we ought to require bonds in every instance. A five-acre exemption makes no sense.

I am sure that of all the mining that is going on on BLM lands, for example, only 15 percent of them have bonds on them, but I am quite sure the vast majority of them are on tracts of less than five acres. But now we have these environmental disasters that the GAO says would require a minimum of $280 million to clean up. There are people in this city who study this subject constantly, and they say the requirement would be at least twice that amount, and who knows what it would actually take. Four hundred thousand and some acres of unreclaimed mines that people have just walked away from and left the United States Government and probably Colorado to pick up the tab for either reclaiming or stopping the environmental effects of that mining.

So just to begin with, Mr. Jamison, in this day and time is there any legitimate excuse for exempting tracts of five acres or less?

Mr. **Jamison**. I do not think so. We are moving towards bonding all mining operations. Where there is anything beyond casual use we want some kind of a surety. I guess the question really is: is it available so they can get it, and we want to mirror the State as much as possible.

As I am sure you aware, the staff has probably already told you, I had kind of a false start in putting out a bonding policy, and I had to pull it back. It is going to go out again shortly. I had to do that because of some unique circumstances in Alaska, and I think I have that heading down the right track now, so I can go forward with the rest of it. So, shortly you will see a Federal BLM floor, so to speak, in bonding.

Senator **Bumpers**. Mr. Jamison, why should anybody who starts a mining operation on Federal lands not be required to put up a bond to reclaim that land. Why should anybody be exempt?

Mr. **Jamison**. I do not think anybody should, and I think the thing is, let us make them so they can operate in a reasonable and responsible manner. We also have to make sure that there is the ability for them to get the bond, and let me use—can I use Alaska for an example? There is no State bonding. There is no State requirement for bonding. There is basically no bonding available up in Alaska, and so they are just—I have not got a tool for them to operate.

And in the Lower 48 there is a mixed bag. In my home State of Montana we have a bonding, Colorado-bonding, and it goes on. And we go over to Arizona, no. Utah, partially. So, I am trying to get it all heading down in the right direction and go to the goal that you have.

Senator **Bumpers**. Mr. Jamison, I do not want to seem harsh——

Mr. **Jamison**. That is all right.

Senator **Bumpers** [continuing]. What we are talking about here and the reason we are here today on this particular segment of my bill is because we have allowed jobs and the promise of jobs and the prosperous economy in local areas to outweigh any other concern.

You saw the story, now, this morning in *The Washington Post*. It is about Questa, New Mexico, where they apparently have an environmental disaster on their hands, and the people there are torn because this is a fairly major corporation that does, indeed, provide a lot of jobs, but there are a lot of people there who feel that their children are sick. They have been ingesting those tailings. They say the river that runs by it where the tailings have been dumped is biologically dead and probably will be for some time to come.

And my point is not to take the jobs away, but to provide the jobs in an environmentally sound and safe and effective way. And there is not any reason why we cannot have both an environmentally safe method of mining and provide the jobs at the same time. But the public has a right, in my opinion, the taxpayers of this country have a right not to have to pick up the tab for this $280 million of reclamation works that we should have provided for before we allowed the mining to take place.

Now, in the February 1990 BLM publication "Utah Spectrum" the Timberland Mine was highlighted in that issue. Are you familiar with that?

Mr. **Jamison**. No, I am not.

Senator **Bumpers**. Well, that is an abandoned cyanide heap leach operation. I assume it was a gold mine. Do they use heap leach mining for anything besides gold?

Mr. **Barry**. Usually it is gold.

Senator **Bumpers**. Pardon?

Mr. **Barry**. Certainly in Colorado I think it is only used for gold.

Senator **Bumpers**. I have never heard of it being used, so I assume that this is an abandoned gold mine. And, in any event, it still contained a lot of cyanide in the heap and in the pond associated with it, and BLM tried for three years to make that company reclaim that mine. The company took bankruptcy, and so the government had nothing to go after. But, happily, the State of Utah had required a $20,000 bond from them—not us, but the state—and so they were able to reclaim that mine with a state bond.

Now, my guess is that if I knew all the instances where this had happened, there would be literally dozens just like that. Now, Mr. Barry, I take it Colorado does not make any exceptions. Do they?

Mr. **Barry**. Well, we have—we have a—we make no blanket exceptions. We have for under ten acres there is a $5,000 ceiling on your bond. I do not like that. I want to change it in state law. It is not sufficient in many cases. For cyanide operations that exemption does not apply in the ceiling for under ten acres is $20,000. Above ten acres there is no ceiling. The cost of reclaiming the bond is whatever the actual cost of reclaiming is. And, as I say, we have been doing this for about 15 years. We have $200 million in bond in hand. We have a forfeiture rate of less 1 percent, but I think it is because we hold the bonds that we get as much reclamation as we get.

Senator **Bumpers**. I could not agree with you more. I am quite sure. That is the reason you have such a very low default rate. And if your bond ever so slightly exceeds the amount of costs of reclamation, they are going to reclaim it.

Mr. **Barry**. Oh, absolutely. There are many reasons for a company not to allow a bond to be forfeited, at least under Colorado law, because when you do that, your ability to do business as a mining operation in Colorado is pretty well foreclosed. You are in violation, and you will not get any more permits.

Senator **Bumpers**. Mr. Jamison, you state that in the past in any event—and I know you are working on regulations—I am going to come back to that in just a moment. But you state that once a permit to mine has been given—and I assume this applies whether you get a bond or whether you do not—that you monitor that. You have people who actually go in and inspect that mining operation from time to time and monitor it.

Mr. **Jamison**. That is correct.

Senator **Bumpers**. Now, my question to you is, if you find an environmental disaster in the making, what do you do?

Mr. **Jamison**. We can issue a notice for them to change their methods or clean it up to the standards. If it is a permitted operation, they have a plan of what they are going to do, and we expect them to follow it. And if they do not, we stop them.

Senator **Bumpers**. Can you give me an instance of where you have done that?

Mr. **Jamison**. I cannot recall one off the top of my head as a rock hard one. I am sorry. Chip?

Mr. **Barry**. Well, just—I do not want to answer the question for BLM. I have trouble putting myself in Federal shoes often enough. But at least in Colorado, Senator, we do joint inspections often with BLM. If we find an operation on BLM land and we have a permit on it under the terms of our memorandum of agreement, we find it not to be in compliance, we will either issue a cessation order, a notice of violation, we may levy a fine, we may issue a corrective action on the operator. There are a number of actions which we can take under state law.

Now, this—obviously our state law goes no further than our boundaries but, again, if we are talking about a BLM operation, we can take pretty severe action, require a number of different things, and going all the way up to major fines and orders of cessation.

Senator **BUMPERS**. Well, you can certainly seek an injunction to stop them from going any further?

Mr. **BARRY**. Well, we do not even need to do that under the terms of our law. We can issue a notice of cessation to the mine operator and tell him he cannot do any more mining, particularly if it is a matter of severe public—severe hazard to the public health such as an overflowing pregnant solution pond and a sodium cyanide heap leach operation. If that thing is overflowing, we can do a lot of different things to bring a halt to that.

Mr. **JAMISON**. I remember one now.

Senator **BUMPERS**. You want to comment on that, Mr. Jamison?

Mr. **JAMISON**. Yes. One comes to mind. My home state of Montana. We—and I think you will be hearing from the gentleman. Pegasus Gold, before they expand their operations and go on to another phase of it, the State of Montana, with whom we have an agreement just like we have in Colorado, basically says you have to do this, this and this. If they are not doing that, they are not going to continue on with the thing, and we act in concert with the State on that. So I guess that is kind of an example where an ongoing operation has to be permitted, next step, before they can go on.

If they have been a good operator, I do not see why we cannot let them go with the next steps as long as they have fulfilled the ones that we have required of them.

Senator **BUMPERS**. What if somebody comes to you, Mr. Jamison, and they say we have found this hard rock mineral on this claim and we want to mine it. And you say this is just hunky-dory with us, but we need a $100,000 bond for this particular mine. The guy comes back two weeks later and he says I have searched diligently everywhere, and I cannot make a $100,000 bond. Nobody will write a $100,000 bond for me. Now, what do you do?

Mr. **JAMISON**. It depends on what our agreement with the State is. Technically, right now under the rules and regulations, we could let him go.

Senator **BUMPERS**. You would let him start mining, would you not?

Mr. **JAMISON**. Let me finish.

Senator **BUMPERS**. Unless he was going to endanger some species.

Mr. **JAMISON**. That is right and then we could pull it back for some other reasons, but it distinctly——

Senator **BUMPERS**. But if he can prove to you that he is not endangering anybody—anything on the endangered species list, you let him mine, do you not?

Mr. **JAMISON**. Let me step back a little bit.

Senator **BUMPERS**. All right.

Mr. **JAMISON**. Okay. I agree with you. That is—under the policy that I am going to put in place, that will not be the case anymore because we will establish what those floors are and, if he can meet those requirements—the key is that we are going to say that these types of sureties, whether it is a cash bond, savings account, lien on your property or whatever meets the requirements, we say these are available out there for everybody else. You have to meet it. If you do not, you are out of luck. That is what I am heading for.

Senator **Bumpers**. All right, let me go just a step further and, Mr. Henson, let me address this question to you because the Forest Service, they get a bond in about 85 percent of the cases.

Mr. **Henson**. That is correct, Senator.

Senator **Bumpers**. I am curious about why you do not get them in 100 percent but, be that as it may, let us assume the same scenario that you mentioned a moment ago. You have got a miner out there, and you are monitoring him, and he has given you a bond. And you look over his operation and you suddenly realize that that bond, based on the kind of operation he is carrying on, is not going to be nearly sufficient to cover the damage he is doing. In other words, if he walks away from it—let us assume you have a $50,000 bond and you can already see a $100,000 reclamation charge, and you know that he is probably going to walk away from it, and you are going to be left holding the sack for that additional $50,000. What do you do in that instance?

Mr. **Henson**. Well, I believe we would negotiate or require a higher bond before we would allow him to continue his operations.

Senator **Bumpers**. Now, let me ask you this question. Can you give me an instance where you have done that?

Mr. **Henson**. I am not aware of an instance where we have done that because, quite frankly; I do not think we have had that kind of a problem with our bonding procedures. Senator Bumpers, our bonding requirements have seemed to have worked out pretty well and if we have people that are in noncompliance with the operating plan, we simply cite them for noncompliance and serve them notice that they either have to improve or they will not be permitted to operate.

Senator **Bumpers**. Mr. Jamison, your home is in Montana?

Mr. **Jamison**. Absolutely. I see the title on the sheet, and I probably guess you are right in the right State.

Senator **Bumpers**. Well, here is a story from the Lewistown News-Argus.

Mr. **Jamison**. Lewistown.

Senator **Bumpers**. Lewistown——

Mr. **Jamison**. Right.

Senator **Bumpers** [continuing]. News-Argus dated July 27, 1986. At the Golden Maple Mine near Lewistown, Montana, cyanide from a heap leach operation was released into the groundwater contaminating a nearby rancher's water supply. The company's reclamation bond of $36,500 was grossly inadequate to clean up the site. The state estimated the cost of minimal surface clean-up to be $115,000 to $120,000, which means the state is going to wind up picking up about $84,000 of that cost. Are you familiar with that one?

Mr. **Jamison**. Not that one. I am only aware of one other one in the western corner of the State where we had cyanide where a containment pond had broken, but I was not aware of the one at Lewistown.

Senator **Bumpers**. Another one from the Great Falls Tribune, June 30, 1988. The Nelly Grant mine, 20 minutes southwest of Helena, was abandoned in 1982 after the mining company Sparrow

Resources, Limited, of Canada, folded. Bonds originally posted by the company were insufficient to cover reclamation costs. The state has already spent $60,000 on reclamation work at the site, which is contaminated by heavy metals, cyanide and arsenic. The company also left behind over $200,000 in fines for water quality violations. Are you familiar with that one?

Mr. **Jamison**. I think that is the Forest Service.

Senator **Bumpers**. Pardon? [Laughter.]

Mr. **Henson**. Cy says he thinks that is the Forest Service, and I am not familiar with that. Is that an active mining operation or one that is——

Mr. **Jamison**. No, it is down in the old mining district.

Mr. **Henson**. Yes, we do have some—I think I am vaguely familiar with that. If it is ours, it is one of those cases where it was pre-1974, pre-bonding requirements, pre—when that kind of damage——

Senator **Bumpers**. This was in '82, 1982.

Mr. **Henson**. When we found the damage or that the mining is occurring?

Senator **Bumpers**. This was abandoned. I am not sure, I must confess. If it was abandoned in '82, I am sure when they started mining.

Mr. **Henson**. That is not really a historic mining district outside of Helena, and I guess——

Senator **Bumpers**. Well, we are not making distinctions here between what is a historic mining area and what is not.

Mr. **Jamison**. I understand that.

Senator **Bumpers**. And here is another one, the Little Jim Mine in the Little Belt Mountains in central Montana had a bond of $71,600 posted in 1982. Two years of mining resulted in damage that the state estimates will cost $218,000 to reclaim. The site is currently unsafe and hazardous. State officials could only comment that, "I would guess at the time the bond was adequate."

I want to ask this question of you, Mr. Henson, and you, Mr. Jamison. Why does the Forest Service have much more stringent requirements for bonding than the BLM does?

Mr. **Henson**. I cannot answer that question for BLM.

Senator **Bumpers**. I mean, it does not make any sense, does it? There ought to be a common policy.

Mr. **Henson**. I agree.

Senator **Bumpers**. All right, Mr. Jamison, let me go to you, now. You have made a statement here that is fairly glowing and what you want to do and what you propose to do.

Mr. **Jamison**. Right.

Senator **Bumpers**. My question to you is, do you care if we do it for you by law rather than waiting for you to do it by regulation?

Mr. **Jamison**. I will beat you.

Senator **Bumpers**. What?

Mr. **Jamison**. I will beat you. I will have it done before you get it through Congress.

Senator **Bumpers**. I want you to hurry right along.

Mr. **Jamison**. I will. [Laughter.]

Mr. **Jamison**. The bottom line, Senator, is, I can take care of that through regulation.

Senator **BUMPERS**. Are you talking about policy or regulation?

Mr. **JAMISON**. If it takes regulation to do it, we will do it.

Senator **BUMPERS**. I promise you, it takes at least regulation, Mr. Jamison.

Mr. **JAMISON**. We are basically instructing our field through existing regulations that, I think the authority is out there—we feel it is—that we can go ahead and do this. And I am going to do it fairly quickly, probably by the first of next month, we will have the beginnings of it in place. That we can do with regulations, if we have to. If it does, I will go for regulations. It takes longer and costs a few more bucks, we will do it.

Senator **BUMPERS**. Mr. Barry?

Mr. **BARRY**. I would just like to make an appeal as the state representative. Whichever one of you does it—and I do not care which—I would hope you would leave an avenue in there, so we can be flexible enough, so that the mine operator does not end up with duplicate bonding on both under a state permit and a federal permit.

Senator **BUMPERS**. That the miner does not wind up doing what?

Mr. **BARRY**. I do not want to have to have him post two bonds to do the same work: one to satisfy Cy Jamison, and one to satisfy my agency. All I would ask either one of you is, whatever you do, leave an avenue in there, so we do not have duplicate bonding for the same work.

And frankly, just one other comment, the only basis for computation of a bond should be the actual reclamation cost of doing the work that needs to be done. That ought to be done on an engineering basis, not on the basis of some blanket cost per acre. It ought to be, you ought to compute exactly what it costs to fix it, and it ought to be kept up-to-date on a monthly or every four/five month basis. And if we do it that way, we will not have a big difference.

Senator **BUMPERS**. Let me make this point. My guess is that when you require a bond, that bond—and these news accounts that I read a moment ago bear this out—when you require a bond, you are normally looking at what it would cost to reclaim that property if you were going to start reclaiming it that day.

Mr. **BARRY**. That is right.

Senator **BUMPERS**. 10 years later the cost of reclaiming that may be three times that much.

Mr. **BARRY**. That is exactly right.

Senator **BUMPERS**. Now that is the reason I was pursuing the line of questioning. When you monitor a site, and you realize that this bond you have taken is not nearly adequate to cover what is going on there, I want—Cy—I want the law to state that you have an obligation to stop right then, or stop him, or require him to post an additional bond. Because if he happens to go belly up—the taxpayers are going to be hung with the rest of it.

Mr. **BARRY**. Senator, there is no question that you are right about that. And that is why in Colorado, particularly for the big operations, we have—the bond amount is a constantly moving target. And we reassess the required bond for a big operation every several months.

Senator **BUMPERS**. Now, there is one other point, and that is, if you walk up on a site during the course of the mining operation—

and I think, we cannot do everything in the law, most of this has to be done by regulations—but this monitoring ought not to just be a pro forma function.

The monitoring ought to be done with a view to making sure that the bond is adequate to cover the damages that are being done at that moment.

Mr. **JAMISON**. May I reply to that, Senator?

Senator **BUMPERS**. Certainly.

Mr. **JAMISON**. I think the key to this is we need to phase the bonding, so we go from one stage to the next. Because I would think it would be very difficult for an operator, maybe even big or small, to go and bond for something that is to be ratcheted up at the end of 10 years.

What I would propose is that we bond, and we have the plan set up as such as if we look at it maybe after a year, a year-and-a-half, and he has completed that phase, well, then we can move the bond on to the next phase. And if we need to ratchet it up, we can there. I think we have to do it phase-wise, or we are in big trouble.

Senator **BUMPERS**. There is one other illustration you should take into consideration, if you are trying to draft some regulations on this, land that is, when you find that there is a site that in the land manager's judgment simply ought not to be mined, that it cannot be reclaimed, or that the bond to reclaim it would just be prohibitive. It ought not to be mined.

And I want the BLM to have the fortitude to say, look, we are sympathetic, but we have concluded that you just cannot make a bond big enough for this. Or that this site is just too valuable to the surrounding area to be mined—something like that. There must be sites galore that should never have been mined in the first place, because it would be utterly impossible to reclaim them to anything like their previous condition.

How do you make certain, when you issue a permit, particularly at BLM, Cy, how do you make certain that this guy is not a fly-by-night operator that has not already opened three or four mines and walked away from them?

Mr. **JAMISON**. It is tough. And I do not say we are perfect——

Senator **BUMPERS**. I mean, you know, these guys can form new corporations. I used to incorporate people for $125.

Mr. **JAMISON**. I guess, what I am going to say is, if you have people who are intent on breaking the law like that, there are probably going to be those who are around—remember Mr. Zwifel who filed claims all over the United States back, I think, in the early 1970s? We are always going to have a problem with those types of individuals, and I do not know whether we can catch them all. But, if we have a guy who has historically abused his privilege out there of operating under the mining law, I think, we should be able to keep track of that, because he is an active miner.

It is the ones who come in and form up over a day or night, just as you said, and go. We are going to have some problems, always will. But I hope that through our land-use decisions that we monitor closely, and we are doing more inspections. I hope that we can at least catch the majority of them.

Mr. **BARRY**. Senator, in Colorado, on that question your application has to disclose whether you are in violation of any mining law in Colorado. And if you are in violation, you are not eligible for another permit.

Senator **Bumpers**. It is easier to do that at the state level, I think, Mr. Barry, than it is at the national level, which is what BLM will be confronted with. I mean, to catch a guy that has already gone belly up in Montana and is applying for another permit might not be too tough. But for a guy who went belly up in New Mexico and is now seeking a permit in Nevada, I guess, it would be a little more difficult.

Mr. **Barry**. Well, it is done. As a matter of fact, those kinds of provisions, almost identical to what you are talking about are part of the Service Mining and Coal Reclamation Act passed by Congress in 1876. So there is a model for that.

Mr. **Jamison**. And they have had a lot of problems enforcing that part of it, too.

Senator **Bumpers**. I want to correct the record on one thing. I said a moment ago that BLM only has bonds on 15 percent of the applications and permits; it is 22 percent. I stand corrected on that.

Mr. **Jamison**. Thank you.

Senator **Bumpers**. Cy, have you read this series of articles in the *Sacramento Bee*?

Mr. **Jamison**. I have read most of it, yes.

Senator **Bumpers**. Have you read them, Mr. Henson?

Mr. **Henson**. No, sir.

Senator **Bumpers**. I will see that you get a copy.

Mr. **Henson**. All right, I appreciate it.

Senator **Bumpers**. Have you, Mr. Barry?

Mr. **Barry**. No, sir, I have not, I would love a copy.

Senator **Bumpers**. I hope that guy gets a Pulitzer Prize; he has earned it. But he has shed more light on this whole problem than I and this committee or the Senate would ever be able to. And I think he did a magnificent job on the series, and I recommend it highly to you, if you have not read it.

Senator Burns.

Senator **Burns**. Thank you very much, Mr. Chairman.

I have just got a couple of questions, I guess, just to clear up in my own mind and some for this committee.

Mr. Henson, what percentage of mining operations on national forest lands require a plan of operations?

Mr. **Henson**. Well, of the—I have to give you a little convoluted answer to that. We have 7,000 active mining—active sites. And of those, I think, about 1,000—see, approximately 3,100 operations—3,100 of our 7,000 active sites require any operating plan.

Senator **Burns**. Think everyone should file an operating plan no matter what size or even——

Mr. **Henson**. If they are going to go forth with mining operations, yes, we would require an operating plan.

Senator **Burns**. And just another question along this line. I guess not everybody is a miner, and not everybody can go out and look at a site to see that if it is a mine, if it can be reclaimed.

Cy, I will ask this of you, do you train any BLM people specifically in this area?

Mr. **Jamison**. Yes, Senator Burns.

At our Phoenix training center, we have about, I think, seven courses that are directly related to monitoring mine sites. One of the places that we are really trying to strengthen our training is in the cyanide heap leach operation, so we have people who are on the ground that actually know what a cyanide heap leach operation does, what are some of the problems associated with it and some of the mitigation measures. So that is where we are trying to concentrate our effort right now.

Senator BURNS. We have had a lot of—we have had a lot of press in Montana on that particular problem in Montana in gold mining. And can those leaching areas be reclaimed?

Mr. JAMISON. I think so, yes, they have to be. What we want to do is just make sure that it is done in an environmentally sensitive and safe place. We do not want to leave any toxic materials out there; we want to make sure that everything is neutralized before they leave; we want to make sure the pads are cleaned up and the area is reclaimed.

Senator BURNS. I would just like to state for the record that Montana, especially in strip mining coal down in Eastern Montana, is probably one of the show cases of reclamation, where we have got a prairie that is producing more grass now than it did before coal was extracted and taken. In those areas they know how to move their dirt now and where to pile it. The subsoil goes back into subsoil condition, top soil is replaced and reseeded. And those areas are coming along really well.

And I would invite anybody to go out there and take issue with the reclamation that the coal companies have done down in Eastern Montana.

Senator BUMPERS. So you think we ought to do the same thing on hard rock mining, do you not, Senator Burns?

Senator BURNS. Well, I think, it should be put back in a condition that would be the way it started. Although, I realize there are some areas that just cannot be done. But I think we should get as close to it as we possibly and humanly can. So that is all the questions I have, Mr. Chairman. Thank you very much.

Senator BUMPERS. Senator Burns, I have been to that area down at COLSTRIP that you allude to. And I must say it is impressive. And they have done a good job down there reclaiming the land. And I do not want to get too stringent on it, but you know, in my state, particularly my home county, we had nothing but coal dumps within three miles of where my home was.

And how under this abandoned mine reclamation program, the so-called RAMP program, we are reclaiming those orphan mines at a staggering cost, sometimes $10,000 an acre for land that is probably worth no more than $200 to $300 an acre after it is reclaimed. But I knew, you know, as a child—I knew just at the belt-buckle level—knew there was something badly wrong about taking coal out of a 14 inch seam of coal and leaving these gigantic dumps there.

And now, of course, we are paying a staggering price for that. And what I want to do in this hard rock mining business is to stop that too. And do what everybody here, particularly at this time when everybody is euphoric about Earth Day—everybody knows, you know, we are not doing this to the earth, we are doing it to ourselves. The earth will be here after we are gone.

So you are not punishing the earth by not requiring reclaiming it. We are punishing ourselves. And that is the real dichotomy of it and the tragedy of it.

Senator **Burns**. Can I add something to that, Senator? And I think you are right on. We had the same things up in Northwest Missouri. What he is talking about, the same land, when I was a kid, that is sure right. But I also want to footnote that technology of reclaiming now is a lot different than it was then. We know a lot more now.

The only thing that we do not know down at COLSTRIP where you are alluding to, we do not know what we have done to the aquifer, and that will all come out later. That will all come out later. But we must not forget that along with our technologies in mining, our technology in reclaiming is a lot better today than it was years ago too. So times change and sometimes we hope it is for the good.

Senator **Bumpers**. One final question, Mr. Jamison.

Dean Swickard, the BLM Folsom District in California says, he has two people to inspect 10,000 permits. And Vin Nunn in Nevada says, he has four people to monitor 900 active operations in an area the size of New Jersey.

Now, obviously, you are woefully undermanned. Have you asked in your budget this year for any increase in personnel for monitoring these sites?

Mr. **Jamison**. Yes, Senator. You are probably well aware that we have asked for a $100 diligence fee. The Administration has a proposal on that, which would generate approximately $97 million in revenue, of which we would take about, I think, $12 million for our mining law administration, which would be an increase of about $4 million for next year.

Senator **Bumpers**. How much of this $100 fee is BLM going to get for personnel?

Mr. **Jamison**. Actually for personnel? I do not know the exact number for personnel, but the rough figure is, it is about a $4 million increase of where we were at last year.

Senator **Bumpers**. How much is your personnel budget going to be now?

Mr. **Jamison**. I will have to get you that figure—the exact figure. I think we have approximately nationwide 50 percent or more, we have over—almost 600 people involved in the mining law administration. And actually what is out on the ground for inspections—I am not sitting here, saying we do not need an increase, we have asked for one.

One of the things we must keep in mind is, I would rather take the money when we can use it, and we have to train these people. And it is about two years down the track before they actually become real operative in the field. And so we put on a few, run them through the training program and get them out in the field. I am trying to bring it up in stages.

Senator **Bumpers**. Mr. Jamison, let me ask you, and Mr. Barry and Mr. Henson all this question. And this really relates to the first hearing we had on mining law reform, not this hearing. But I keep coming back to it.

If you had to go out before 100 absolutely impartial taxpayers across the country and justify the way we allow hard rock mining to be done in this country, often without bond, always without a lease payment or without any royalties of any kind, whereas we do not do it with anything else—we do not do it with oil and gas, we do not do it with coal; we require all coal lands to be reclaimed without exception; we make them pay a royalty for every ton of coal they take; we make them bid competitively for the lease on the coal to begin with, as we do on oil and gas—do you think with a 100 fairly intelligent, impartial taxpayers of America, you could justify not doing the same thing for hard rock mining?

Mr. JAMISON. Starting me, sir?

Senator BUMPERS. Yes.

Mr. JAMISON. I would phrase the question back to them like this, I would say the Mining Law has been on the books since 1872, here are the four tenets of the Mining Law: access, diligence, tenure, so on. And I would say, as a national debate, where do you want it to go from here. And they would have to give us the answer to that. Because we have been up to this, it served the country fairly well up to this point.

And it is also one of the highest risk businesses there is. And I have noticed the oil and gas business is getting much more risky too. It used to be three to one for every three wells you put down, you might hit something on the third or fourth one. Now that is moving up, just because it is getting harder to find.

It is the same way in the mining industry. A lot of the easy loads are probably gone. We are going back with these very sophisticated methods of heap leach to get gold out. On other materials, you go up to my home State and Senator Burns', you go up in the Stillwater area where we are after platinum, palladium, that is no—excuse the term—minor operation. That is a very sophisticated operation.

I guess, I would have to ask them is, what do you really want to come out of it?

Senator BUMPERS. Let me ask you another question.

I have been guilty of making this speech. And without putting words in Senator Burns' mouth, my guess is that he has said things very similar. And that is, if you will elect me to the United States Senate, I will treat your land and your money like it was my own.

Now having said that, if you had 500 acres of land, would you let somebody come on there and mine it without any questions asked?

Mr. JAMISON. And I will be very parochial and very selfish, and I would say, you are going to pay through the nose to do it.

Senator BUMPERS. So any politician that said that and would not allow them to do that on his own private land is not being totally truthful with the taxpayers, is he?

Mr. JAMISON. I have never said anything about a Senator.

Senator BUMPERS. Mr. Barry.

Mr. BARRY. In answering your question, looking at some testimony or some notes that I gave where Lisa Vehmas and I were on a panel about—partly about your bill. And one of the things that I wanted to find out before I gave that speech was, what was the outcry in 1920, when a number of minerals were taken from the 1872 mining law and put in the 1920 Mineral Leasing Act?

I am sure there was a great outcry from some of the industries saying, we certainly cannot afford that, that will be a disaster and we will all go under. And I suspect that in fact that has not happened. And that people who went from a locatable mineral to a leasable mineral in 1920 have all survived.

And I think that the same thing can be done to the minerals upon which no royalty is now paid. I do not think the world will go under if, in fact, you have to begin to pay royalties on federal minerals. And I think, in fact, that should happen.

If I have a plea, it would be not to make a blanket across the board royalty rate for locatable minerals on fair land. It depends on the mineral, it depends on the location, and maybe it ought to depend a bit on the exigencies of that particular operator or that particular industry.

Senator **Bumpers**. But would you favor abolishing this antiquated claim process and just going to competitive bidding?

Mr. **Barry**. No, I do not think I favor that. I do not mind——

Senator **Bumpers**. You do not have to run for office, do you?

Mr. **Barry**. No, well, not yet. I have a boss who does, but I do not. I am not offended. I am often into the merits of the larger issue. I am not offended by people being able to make a claim. I am, however, concerned about the ultimate transfer of the surface to the operator for purposes other than the mining of minerals. I do not mind—I think——

Senator **Bumpers**. Really the most egregious case of that happened in Colorado, where some guy—he got a patent for $2.50 for several hundred acres and sold part of it for what? $11,000 an acre?

Mr. **Barry**. Keystone ski area? Is that the one you are thinking about?

Senator **Bumpers**. Yes, that is exactly—that is the case.

Mr. **Barry**. My concern here and with oil shale claims and others is, I think, it may be acceptable public policy to locate a mineral on federal land and obtain a right to mine it. But I do not want to see the surface go with it of necessity. It may be under some circumstances you need some surface. But frankly the proposal I have made—and I will give Lisa a copy of this—is, we ought to go either to leasable minerals or minerals only patented.

I am concerned as a surface manager and as a steward of the environment in Colorado that, there is, in fact, no need to transfer the surface. In some cases, there may be, but as across-the-board policy, I do not favor that. By the same token, I am not terribly concerned that someone should be able to make a claim, but I do think after that, they should pay a royalty.

Senator **Bumpers**. Mr. Barry, do you have any heap leach gold mines in your state?

Mr. **Barry**. Yes, sir, we do, probably 50 or so.

Senator **Bumpers**. Are you familiar with a couple of problems that those bigger rubber mats they have put under these ore piles——

Mr. **Barry**. Hypalon lines? Yes.

Senator **Bumpers**. Have you seen the leak?

Mr. **Barry**. Yes, in Colorado we require basically a triple lining system. It is usually a clay—a clay liner, a hypalon liner, gravel, another layer of hypalon. We require a monitoring system between liners. So that if there is any leakage, it is detected, and it is contained by the second liner.

Senator **BUMPERS**. Do you do anything to protect water fowl in these tanks that are laced with cyanide? Several thousand birds have died.

Mr. **BARRY**. In some instances, yes. We either require netting or the pyrotechnic devices that will scare the birds away. I am not aware—in Colorado, at least, we have had too much of a problem with water fowl. We do require fencing for livestock. We did have a horse die from drinking from one of those ponds a few years ago. So we are aware of those problems.

Senator **BUMPERS**. Gentlemen, thank you all very much. We will be submitting a number of questions in writing to you.

Senator McClure is tied up in Energy and Water Appropriations Subcommittee hearings and cannot be with us. But he will also be submitting some questions for the record.

Thank you very much all of you.

Our next panel is Mr. Edward Belsky, Account Executive, Frank B. Hall & Company of Washington—that is Seattle, Washington; Mr. Marcel DeGuire, Vice President of Environmental Affairs, Newmont Gold, Denver; Mr. John Fitzpatrick, Director, Community and Governmental Affairs from Helena, Pegasus Gold. Pegasus, I am sorry. Incidentally, that is the correct Greek pronunciation.

Mr. Richard Parks, Secretary, Northern Plains Resource Council, Gardiner, Montana; Mr. Glenn Miller, Professor, University of Nevada, Reno—a school of some note these days—Mr. Michael Gregory, Co-Director, Arizona Toxics Information Project, Bisbee, Arizona.

Gentlemen, if you can summarize your statements, it will be very helpful. We want to terminate this hearing in a timely way. And I am going to put the light on for five minutes and ask you to summarize.

My first witness on this list is Mr. Edward Belsky for Frank B. hall & Company.

STATEMENT OF EDWARD M. BELSKY, CHARTERED PROPERTY AND CASUALTY UNDERWRITER, FRANK B. HALL & CO. OF WASHINGTON

Mr. **BELSKY**. Thank you for the opportunity to offer my views on the issues and related problems for hard rock mine operations as regards reclamation bonding availability. What I do is, I am an insurance broker, and I am hired by my clients to obtain bonding for them in that commercial surety field.

I would like to emphasize that a reclamation bond is not an insurance policy. Beneficiaries are different, the premium setting principles are different, and the expected losses that will occur are much different.

The availability of reclamation bonds for hard rock mine operations is minimal at best. Small to medium size operations are experiencing an increasingly difficult time finding affordable bonding credit.

By the pure nature of the reclamation bond obligation only large financially sound operations who have a good track record and are assured of meeting their financial obligations far into the future are able to obtain bonding at reasonable cost. In the future unless changes are made these same large companies may find it difficult to obtain the bonding they need.

I feel that the availability problem is due to many reasons. The surety industry has stated that in order to improve the availability of reclamation bonds, a surety would need a better focused and refined program of bonding requirements.

The changes that are needed include: mandatory allowance of incremental, as well as phased bonding; the bond contract that is used by the federal agencies as well as some state agencies must be changed to allow a cancellation provision for land which has not been disturbed; the revegetation period needs to be better defined and the time period reduced to no longer than one or two years; and the surety industry needs—or feels they need—immunity from the joint and several liability associated with hazardous mine waste regulated under RCRA or CERCLA.

The stronger the environmental laws become the more the insurance industry will resist issuing bonding credit. As an insurance broker, I am hired by the mine operator to find bonding for their operations. The lack of bonding companies willing to write reclamation bonds at affordable rates and with reasonable collateral requirements is scary. It is not unusual to find that after talking with six or seven bond companies they are demanding 100 percent collateral and a 4 percent bond premium. It is obvious if my clients had a 100 percent collateral available, they would not need to bond.

Action on the above mentioned changes should be implemented if the government wants to keep the United States mineral industry from being controlled by a relatively few large companies. The small, independent, American-owned mine operator is being squeezed from all sides. The surety problem is just one of many the mine operator is facing. However, the surety problem is solvable.

I think that by working together, implementing the above steps, I feel that qualified mine operators will find a surety willing to support their operations. I invite the committee and staff to contact me at any time regarding reclamation questions.

[The prepared statement of Mr. Belsky follows:]

STATEMENT OF
EDWARD M. BELSKY, C.P.C.U.
Frank B. Hall & Co. of Washington
Insurance Brokers and Consultants

Before the
Subcommittee of Energy and Natural Resources
United States Senate

Concerning Reclamation and Bonding Practices Associated with Hard-Rock Mining

April 19, 1990

Mr. Chairman and Members of the Subcommittee:

Thank you for the opportunity to offer my views on issues and related problems for hard-rock mine operations as regards reclamation bonding availability.

My background includes undergraduate college training with dual degrees in geography and geology. After graduation, I was employed as an exploration mineral geologist. I obtained a solid background in many aspects of mineral location, mine-site development and mineral beneficiation. I left the mining community in 1978, at which time I pursued a career in insurance and risk management. I am a Chartered Property and Casualty Underwriter, and have an advanced degree in risk management. I am a member of the Reclamation Bond Committees for the states of Nevada and Oregon. I am the chairman of the Northwest Mining Association's Bonding Subcommittee. Northwest Mining Association represents 3,100 members throughout the United States. These represented companies are involved in all aspects of the mineral industry. I am currently employed with Frank B. Hall & Co., which is the nation's sixth largest insurance broker.

I would like to emphasize that a reclamation bond is not an insurance policy. The beneficiaries are different. The premium setting principals are different. The expected losses that will occur are much different.

The availability of reclamation bonds for hard-rock mine operations is minimal at best. Small- to medium-size operations are experiencing an increasingly difficult time finding affordable bonding credit.

By the pure nature of the reclamation bond obligation, only large, financially sound operators, who have a good track record and are assured of meeting their financial obligations far into the future, are able to obtain bonding at a reasonable cost. In the future, unless changes are made, these same large companies may find it difficult to obtain the bonding they need.

The availability problem is due to many reasons. The surety industry has stated that in order to improve the availability of reclamation bonds, a surety would need a better focused and refined program of bonding requirements. The changes that are needed include:

1. Mandatory allowance of incremental, as well as phased, bonding. The idea of breaking up the financial guarantee requirements to smaller segments with the combined total of the segments equal to the ultimate mandated amount is not new. This practice is referred to as "phased" bonding, and is absolutely essential to any effective bond program. Phased bonding allows an operator to structure his bonding program to achieve two main goals:

A. The first accomplishment that phased bonding allows is lowering the face amount of the individual bonds. The lower bond amount reduces the possibility that the bonding company will have to purchase reinsurance for that particular bond. If the bond company can avoid reinsurance transactions, it can write the bond at a lower premium and with less problems, thus, saving the mine operator money and time.

B. The second benefit to phased bonding is that each particular bond is designated to a particular phase of the reclamation project. This insures that once each phase of reclamation is completed, such as back filling or recontouring, the bond covering that phase is released. this benefits the operator in several ways:

I. It frees up the operators "bonding credit" for future bonds that may be needed.

II. It allows the operator to match his liability exposure with the bond amount. As an example, let's assume one single bond is required by the Forest Service for an entire project in the amount of $100,000. The operator has completed the entire reclamation project, and is now in the vegetation maintenance phase. The liability exposure, at this point in time, may be only $5,000 - $10,000 but the operator must continue to post the $100,000 bond guarantee. Phased bonding would allow the operator to have posted a minimum of three bonds, one of which would have been designated for the maintenance portion of the reclamation plan. The remaining portions of the reclamation would have been completed and accepted by the Forest Service. The bonds would have been released, and the operator would have increased his bonding line of credit by upwards of $95,000. Phased bonding allows all parties to the reclamation process to be in a classic win-win situation.

III. Incremental bonding will allow the permit area to be divided into discrete areas, each of which is bonded only when it is about to be actively disturbed. This allows the operator to reduce his dependency upon bonding and allows the government agencies to more accurately determine bond liability in conjunction with such areas as increased environmental concern and inflation. Again, a win-win situation.

2. The bond contract used by the federal agencies, as well as some state agencies, must be changed to allow a cancellation provision for land which has not been disturbed. The cancellation and bond release process need to be responsive and timely. This will provide the surety assurance of no further liability once the bond is released, and will also free up the operator's surety credit for new operations.

3. The revegetation period needs to be better defined, and the time period reduced to no longer than one or two years.

4. The surety needs immunity from joint and several liability associated with hazardous mine wastes, regulated under RECRA

> or CERCLA. The stronger the environmental law becomes, the more the insurance industry will resist issuing bonding credit.

As an insurance broker, I am hired by the mine operator to find bonding for their operations. The lack of bonding companies willing to write reclamation bonds at affordable rates and with reasonable collateral requirements is scary; it is not unusual to find that after talking with six or seven bond companies, they are demanding 100% collateral and a 4% bond premium. It is obvious, if my clients had 100% collateral available, they would not need the bond.

Action on the above-mentioned changes must be implemented if the government wants to keep the United States mineral industry from being controlled by a relatively few large companies. The small, independent, American-owned mine operator is being squeezed from all sides. The surety problem is just one of many the mine operator is facing; however, the surety problem is solvable. By working together - and implementing the above-mentioned steps - I feel that qualified mine companies will find a surety willing to support their operations.

I invite the committee and staff to contact me at any time regarding reclamation bonding questions.

EB/sll

Senator BUMPERS. Thank you very much, Mr. Belsky.
Mr. DeGuire.

STATEMENT OF MARCEL F. DeGUIRE, VICE PRESIDENT, ENVIRONMENTAL AFFAIRS AND METALLURGICAL RESEARCH, NEWMONT GOLD CO.

Mr. DEGUIRE. Senator Bumpers, Senator Burns, my name is Marcel DeGuire, and I am Vice President of Environmental Affairs and Metallurgical Research for Newmont Gold Company. Newmont is the largest gold producer in North America with its operations in Nevada producing over 1.4 million ounces in 1989.

Before discussing Newmont's reclamation efforts and Nevada's reclamation program, I believe it is important to point out some critical differences between reclamation of surface coal mines and open pit metal mines. While coal is found in discrete seams, most metallic ores mined today are finely disbursed in a host rock with no apparent boundary in the mineralized zone.

This difference in the nature of the ore bodies has important implications with regard to the reclamation of surface mines. For example, the practice of concurrent reclamation, common coal mining is not generally applicable to metal mining. As a coal miner follows a seam of coal, he can simultaneously reclaim the mined-out area.

However, in open pit metal mines, all of the ore and waste material must be removed from the pit before any reclamation can be accomplished. For many mines this can take over 20 to 30 years. Back-filling open pits would likewise take many years and offer little or no environmental benefit at enormous cost.

There are, however, other types of surface disturbances associated with metal mining, which are amenable to reclamation once operation ceased and which impact a larger surface area than the open pit itself. Generally speaking, waste rock, tailings impoundments, heap leached piles and exploration low roads can all be returned to productive uses once activities are completed.

These and many other differences between coal and non-coal reclamation are detailed on the findings of the Committee of Surface Mining and Reclamation known as the COSMAR report. This study mandated by the Surface Mining Control and Reclamation Act or SMCRA examines the need for a similar federal statute to address reclamation of non-coal mines. It concluded that a SMCRA analog for metal mines would be generally unworkable for a number of reasons.

In reference to back-filling open pit mines they state: "This provision is generally not technically feasible for non-coal minerals. It has limited value because it is impractical, inappropriate or economically unsound." The report is lengthy and complex and cannot be summarized here. However, it clearly identifies numerous concepts and requirements of SMCRA which cannot be applied to the reclamation of metal mines.

With that overview, I would like to tell the subcommittee a little bit about Newmont Gold's reclamation program. Newmont Gold started up in 1964, but its operations are still expanding, and only a small percentage of its surface disturbances are not subject to continued use. Yet, over the past few years, we have reclaimed nearly 45 miles of exploration roads and 178 acres of previously disturbed land.

The great majority of this activity took place on privately owned land, where no reclamation requirements are required. Newmont has also reclaimed nearly four dozen abandoned sites on its property that had been created long before Newmont began its operations. In the coming years, Newmont plans on continuing to reclaim all of its lands that will not be subject to further use. Newmont is initiating a comprehensive program to determine optimum revegetation techniques.

Finally, Newmont has and will continue to factor reclamation considerations into its mine planning procedures, so that we can design our operations to better facilitate final reclamation.

Newmont operates under federal reclamation requirements for our operations on public land. And our operations on private land will soon be subject to a new state reclamation law. Nevada adopted its first reclamation law during the last legislature. This law clearly recognizes that the state has existing and comprehensive coverage of impacts to air, surface water and ground water quality both during active operations and upon their closure.

The reclamation law was designed to work in concert with Nevada's programs for environmental protection and not in place of them. The purpose of the reclamation law is to return lands disturbed by mining or mineral exploration to a safe and stable condition suitable for productive post-mining use. The law applies to both private and public lands. Facilities on public land must comply with the state as well as the federal regulations.

Both mining and exploration projects must apply for state permits and financial assurance that reclamation will be completed as required prior to permit issuance. The law was adopted with Newmont's support as well as that of the Sierra Club and the Nevada Conservation League.

Newmont believes that if Congress is considering federal involvement in reclamation of metal mines, it must do so with a recognition of the differences between surface coal mines and non-coal mines. Mining facilities now face state and federal environmental laws and regulations that are much more comprehensive than those that existed in the past.

Perhaps most significantly the EPA is currently developing regulations for the management of mine waste under the Resource Conservation and Recovery Act of RCRA. These rules will ensure further protection of human health and the environment from mining impacts. Once implemented, this program will provide federal oversight and enforcement of State regulations addressing all aspects of mine closure, including those related to reclamation.

The single element of closure that may not be addressed under RCRA is post-mining use. However, State reclamation laws are specifically designed to address land use issues. And with the exception of two States, all Western States have such laws. Newmont believes that these programs in conjunction with existing and anticipated State and Federal environmental programs will guarantee the protection and enhancement of the environment from the impacts of metal mining.

Thank you.

[The prepared statement of Mr. DeGuire follows:]

Statement of
Newmont Gold Company

on

Reclamation

by

Marcel F. DeGuire
Vice President
Environmental Affairs and Metallurgical Research

before the

Subcommittee on Mineral Resources
Development and Production

of the

Committee on Energy and Natural Resources

April 19, 1990

Good Afternoon. My name is Marcel DeGuire and I am Vice President of Environmental Affairs and Metallurgical Research for Newmont Gold Company. Newmont is the largest gold producer in North America, with its operations in northeastern Nevada producing over 1.4 million ounces in 1989.

Newmont welcomes this opportunity to address the Subcommittee today on the issue of reclamation of lands used by mining of metallic ore. Newmont has extensive experience in this regard, having conducted reclamation work on base metals facilities in Colorado, uranium mining in the State of Washington, and precious metals operations in Nevada.

RECLAMATION OF METALS MINES VERSUS COAL MINES

Before discussing Newmont's reclamation efforts and Nevada's reclamation program, I believe it important to point out some critical differences between reclamation of surface coal mines and open pit metal mines. While coal is found in discrete seams, most metallic ores mined today are finely dispersed in a host rock with no abrupt boundary of the mineralized zone.

This difference in the nature of the orebodies has important implications with regard to reclamation of surface mines. For example, the practice of concurrent reclamation common in coal mining is not generally applicable to metal mining.

As a coal miner follows a seam of coal, he can simultaneously reclaim the mined-out area. However, in open pit metal mining, all of the ore and waste material must be removed from the pit before any reclamation can be accomplished. For many mines, this can take over 20-30 years. Backfilling open pits would likewise take many years and offer little, or no, environmental benefit at enormous cost.

There are, however, other types of surface disturbances associated with metal mining which are amenable to reclamation once operations cease, and which impact a larger surface area than the pit itself. Generally speaking, waste rock containing too little metal content to be considered ore, tailings impoundments used for disposal of milled ore, leaching heaps which have had their metal values removed, and roads created in connection with mining and mineral exploration can all be returned to productive uses when they will no longer be subject to continuing use.

There is another extremely significant difference in the economics of metal mining reclamation, and that is the way that the prices of these commodities are determined. The long-term contracts between coal companies and power utilities factor in reclamation costs as a part of doing business under the Surface Mining Control and Reclamation Act (SMCRA), thereby transferring the costs to the consumer. Prices of metals are determined on the world market, and are independent of production costs. Reclamation costs for surface disturbances at metal mines cannot be passed on to consumers, but are simply added on to the cost of production.

These and many other differences between coal and non-coal reclamation are detailed in the findings of the Committee on Surface Mining and Reclamation, known as the COSMAR Report. This study, mandated by the SMCRA, examined the need for a similar federal statute to address reclamation of non-coal mines. It concluded that a SMCRA analogue for metal mines would be generally unworkable for a number of reasons. In reference to backfilling open pit mines, they state that "this provision is generally not technically feasible for non-coal minerals or has limited value because it is impractical, inappropriate or economically unsound." The report is lengthy and complex, and cannot be adequately summarized here. However, it clearly identifies numerous concepts and requirements of SMCRA which cannot be applied to reclamation of metal mines. The most significant of these include the return of mined land to its approximate original contours.

RECLAMATION AT NEWMONT GOLD

With that overview, I would like to tell the Subcommittee a little about Newmont Gold Company's reclamation program. Newmont Gold started up in 1964, but its operations are still expanding, and only a small percentage of its surface disturbances are not subject to continued disturbance. Yet, over the past few years, Newmont has reclaimed nearly 45 miles of exploration roads and 175 acres of land disturbed during the construction of various production facilities. The great majority of this activity took place on privately-owned land, where no reclamation requirements were required. Newmont has also reclaimed nearly four dozen abandoned sites on its property that had been created long before Newmont began its operations.

In the coming years, Newmont plans on continuing to reclaim all its exploration roads, drill pads and construction sites that will not be subject to further disturbances. In June of this year, we will initiate reclamation of one of the first waste rock dumps used when the first Newmont operations were started in 1964. Topsoil management plans are being developed at all Newmont's facilities to insure maximum availability and productivity of this scarce resource. Newmont will initiate a comprehensive program of test plots to determine optimum planting techniques and vegetative species for each of its disturbances. Finally, Newmont has over the past few years and will continue to factor reclamation considerations into its mine planning procedures to the extent practical so that we can design our operations to facilitate final reclamation. Such prior planning must be done now, even though it will be decades before many of our mines are completed.

RECLAMATION IN NEVADA

Newmont operates under federal reclamation requirements for our operations on public land, and our operations on private land will soon be subject to a new state reclamation law. It is important to note that different state and federal reclamation programs have evolved under different circumstances, and this has resulted in programs with varying goals. The federal coal reclamation program was developed in response to environmental degradation from abandoned mines and in the absence of federal solid and hazardous waste legislation or the cleanup liability of Superfund. Similarly, many of the older state reclamation programs for metal mining operations were also developed in advance of comprehensive state rules for waste management and groundwater protection. Reclamation programs that preceded effective environmental regulations naturally focused on the environmentally sound closure of mining operations.

The Nevada experience is in direct contrast to these types of programs. Nevada adopted its first reclamation law during the last legislature. This law clearly recognizes that the state has existing and comprehensive coverage of impacts to air, surface water and ground water quality, both during active operations and upon their closure. For example, the state's stringent water quality permitting regulations for mining operations required that upon closure, mine sites and disturbances be stabilized so as to prevent degradation of the state's waters. The reclamation law was designed to work in concert with Nevada's programs for environmental protection, not in place of them. The purpose of reclamation law is to return lands disturbed by mining or mineral exploration to a safe and stable condition suitable for a productive post-mining use. While an early draft of the Nevada reclamation bill contained a number of provisions related to environmental protection, there was unanimous agreement among the state regulatory agency, environmental public interest groups and the mining industry that these provisions merely duplicated Nevada's existing environmental programs. Most of these unnecessary provisions were dropped from the final bill, and, as adopted, the law's focus is on the return of disturbed land to some productive use, such as grazing or wildlife habitat, and the protection of public health and safety.

The Nevada law will result in a rigorous reclamation program even though its primary goal involved land use rather than environmental protection. The law applies to both private and public lands; state rules must be generally consistent with those of the Bureau of Land Management, but facilities on public land must comply with the state as well as federal regulations. Both mining operations and exploration projects must apply for state permits, and a bond or other financial assurance that reclamation will be completed is a prerequisite for permit issuance. This legislation is tough but fair, striking a balance between the long-term goals of the state and the economic interests of the mining industry. For example, the law allows for a regulatory exemption for backfilling open pits, which is consistent with the conclusion of the COSMAR Report that such backfilling is impractical. The law was adopted with Newmont's support as well as both the Sierra Club and the Nevada Conservation League.

FEDERAL INVOLVEMENT

Newmont believes that if Congress is considering federal involvement in reclamation of metal mining operations, it must do so with a recognition of the findings of the COSMAR Report. Differences in the nature of coal and non-coal mining present technical problems in the reclamation of metal mines that are significantly different than those involved in coal mining.

However, while the conclusions of the COSMAR Report that are based on the differences between coal and non-coal mining remain valid, its assessment of existing environmental and reclamation regulations is quite dated. In the decade since the report was completed, most western mining states have adopted reclamation programs for metallic mineral mining. Mining facilities now face state and federal environmental laws and regulation that are much more comprehensive than those that existed when the COSMAR Report was issued in 1979.

Perhaps most significantly, the Environmental Protection Agency is currently developing regulations for the management of mine waste under the Resource Conservation and Recovery Act (RCRA). These rules, expected in draft form within the next few months, will ensure further protection of human health and the environment from mining impacts. Once implemented, this program will provide federal oversight and enforcement of state regulations addressing all aspects of mine closure, including those related to reclamation. The single element of closure that may not be addressed under RCRA is post-mining use, as this is beyond the scope of the Act. However, state reclamation laws are specifically designed to address land use issues, and, with the exception of two states, all western states have such laws. Nevada's new reclamation law is exemplary in this context, with its clear requirements for restoration of productive land uses and protection of public safety. Newmont believes that this program, in conjunction with existing and anticipated environmental programs, will guarantee the protection and enhancement of Nevada's natural resources.

Senator BUMPERS. Thank you very much.
Mr. Fitzpatrick.

STATEMENT OF JOHN S. FITZPATRICK, DIRECTOR, COMMUNITY AND GOVERNMENTAL AFFAIRS, PEGASUS GOLD CORP.

Mr. FITZPATRICK. Thank you, Chairman Bumpers, Senator Burns. I am John Fitzpatrick. I am director of Community and Governmental Affairs for Pegasus Gold Corporation. I reside in Helena, Montana.

Pegasus is headquartered in Spokane, Washington. We operate four mines in Montana, two in Nevada. All six of our mines are surface mines, five use a cyanide heap leaching process and one mine in Montana tunnels uses conventional sulfide floatation to recover gold, silver, led and zinc.

As Congress begins the process of examining potential federal regulation in the areas of reclamation and bonding, I think, it is important to keep in mind that mining is an extremely diverse industry. The industry generally is considered to include the coal mining industry, oil and gas, metals and non-metallic elements.

Now within each of those industries, there is a great deal of variation in terms of size and complexity. In the metals business in particular, the industry ranges in size from one and two-man operations that are principally prospecting in nature or small placer operations up to the entities the size of Newmont Gold which have a very large operation, integrated operations in Nevada. Companies like Pegasus fall somewhere in between.

Within the industry, there are a number of different activities, each of which have different results and implications for reclamation and bonding. For example, a metallic mineral project always begins with acquisition. Acquisition could be the purchase of a property or staking of claims on Federal land. That particular activity in itself is generally not very disturbing of the natural resource and, hence the reclamation requirements are generally nonexistent and generally not needed.

Mineral exploration per se in most cases is not particularly intrusive. It can include reconnaissance activities, such as, geochemical and magnetic sampling. In other instances, road building and setting up drill pads and finally, in some instances taking of bulk samples. Again, reclamation activities are generally not intrusive, most are fairly easily reclaimed.

Mining operations per se, again, are quite diverse. You have surface and underground mines, you have leaching operations, you have floatation mills, some of which require tailings ponds, some of which do not. Again, reclamation requirements need to be tailor made to each individual site in each type of mining operation.

Mining is an industry that is already extensively regulated. That degree of regulation varies from site to site and from state to state. In a state like Nevada, historically, most regulation was federal in nature due to the high presence or the large presence of Federal lands in the State. In Montana, regulation is principally state in nature, because most mining operations take place, in fact, on private lands, although, there is involvement from agencies like the U.S. Forest Service and Bureau of Land Management, when federal lands are involved. In other States, such as, New Mexico the regulation is at the local level with Federal involvement, if again, federal lands are involved.

Reclamation is in fact part and parcel of almost all modern mining operations. The major exception being some of the smaller operations that were referred to by people who testified earlier—referred to under various statutes as small miners are prospectors exemptions. Reclamation is, however, a comparatively new process. It has only been with the industry in any exceedingly extent in the last 15 years. Colorado and Montana were among the first to enact the state reclamation and bonding statutes in the early 1970's.

Much of the controversy about mining in many of the instances that have been cited as the reason why federal involvement should be increased in mining are, in fact, relics of a bygone era. It is very common to see in articles about mining, today's mining, essentially references to places like the Clarke Fork River and mining in Butte, places like Ledville, Colorado and the Douglas-Bisbee, Arizona area.

These are historic mining districts. And the disturbance that has taken place and the contamination that has resulted is something that goes back in many instances over 100 years. Relatively few modern mining operations are being cited in these tracks as examples of problems—problem mines today.

Finally, I guess, I would like to make a brief comment about bonding. My experiences primarily with bonding in the State of Montana, where it is handled at the state level, bonding is very comprehensive. It is based upon the actual cost of reclamation, as it is in the State of Colorado. Earlier, Senator, you asked about three examples that you had from newspapers in which the bonds were inadequate. In each case that particular bond—those bonds were set in the early 1980s when in the State of Montana use of a very simplistic formula basis for determining reclamation bonds.

After the experiences that they had, where they could not get adequate cost recovery, the state converted to the method that they employ today of actual cost. Those costs are then periodically updated.

Thank you.

[The prepared statement of Mr. Fitzpatrick follows:]

Reclamation of Mineral Exploration and Metal Mine Facilities

Testimony submitted to
Senate Energy and Natural Resources Committee
Room 364
Dirksen Office building
United States Senate
Washington, D.C.

Submitted by:

John S. Fitzpatrick
Director
Community and Governmental Affairs
Pegasus Gold Corporation
5944 Highway 12 West
Helena, Montana 59601

April 16, 1990

Introduction

On behalf of Pegasus Gold Corporation I wish to thank the Energy and Natural Resource Committee for the opportunity to testify at these oversight hearings to address the subject of the Reclamation of Mineral Exploration and Metal Mine Facilities.

Pegasus Gold Corporation is headquartered in Spokane, Washington, and currently operates six mines in the western United states. Four mines are located in Montana and two in Nevada.

Mine	Location
Basin Creek	Lewis and Clark County, Montana
Beal Mountain	Silver Bow County, Montana
Florida Canyon	Pershing County, Nevada
Montana Tunnels	Jefferson County, Montana
Relief Canyon	Pershing County, Nevada
Zortman/Landusky	Phillips County, Montana

All six of the company's mines are open pit, surface mines. Five mines employ cyanide heap leaching for the recovery of precious metals, principally gold. The Montana Tunnels mine uses conventional sulphide flotation metallurgy for the recovery of gold, silver, lead, and zinc with the precious metals contained in lead and zinc concentrates. All of Pegasus mines extract metals from extremely low grade ore bodies. The average grade of gold ranges from a low of .016 (16 thousandths) of an ounce per ton at the Zortman/Landusky mine up to .045 (45 thousandths) of an ounce per ton at Beal Mountain. Potential fluctuations in metals prices and production cost containment are extremely important considerations in the operation and success of each mine.

Pegasus Gold also operates an aggressive acquisition and mineral exploration program through three regional exploration office located in Spokane, Washington, Butte, Montana, and Reno, Nevada. At any given time over 30 mineral exploration projects will be underway throughout the western United states.

At present, Pegasus Gold's mining operations are predominantly conducted on private lands owned or leased by the company. Federal lands under the management of the U.S. Forest Service (USFS) and Bureau of Land Management (BLM) over which the company has staked mining and millsite claims, are incorporated within the company's permitted mine sites in varying degrees. Mineral exploration also is conducted on federal lands as well as state and private properties.

General Regulatory Framework

The conduct of mineral exploration and mining activities on federal lands is regulated under 36CFR228.

In addition, state and local statutes and administrative rules are applicable depending on the ownership of the property and its location. For example, in Montana, where most of Pegasus' operations are located, mining is governed by the Metal Mine Reclamation Act (84-4-301, MCA). In New Mexico, metallic minerals are principally regulated at the local level through the planning and zoning process, although state agencies administer air and water quality requirements.

Notwithstanding the type of regulation, the general process used to permit mineral related developments is very similar. It consists of an applicant preparing a Plan-of-Operations and submitting same to the regulatory entities for compliance with applicable development standards through some type of environmental review process. A Plan-of-Operations generally includes:

1. Name and address of the applicant.
2. A description of the proposed activity including the type of facilities to be built and method of mining and ore processing.
3. A description and/or map of the project location.
4. Anticipated duration of the project.
5. Plan for the reclamation of disturbed lands and other mitigation efforts necessary to minimize potential impacts to either human or natural environments.
6. Performance bond to insure the reclamation of disturbed lands.

Upon receipt of the Plan-of-Operations, the responsible regulatory agencies:

1. Review the document(s) for completeness and, as necessary, request additional information to clarify or document features of the proposed development.
2. Solicit public input generally through public meetings, hearings, or the circulation of environmental assessments.
3. Prepare an assessment of potential human and environmental impacts.

4. Set forth, as required, additional stipulations or mitigative measures as a condition of project approval.

5. Prepare a reclamation bond estimate.

6. Issue the permit pending receipt of the reclamation bond.

Once project development has commenced the regulatory agencies stay involved in an oversight capacity, inspecting the operation for compliance with the terms of the operating permit, and serving as a technical resource to assist the operator solve problems that may affect the environment.

Reclamation

Reclamation means returning lands disturbed by the taking of natural resources to a condition of comparable stability and utility to that of adjacent lands. While reclamation is a site specific process, it generally involves grading disturbed lands to prevent mass failure (landslides), reduce the potential for erosion, and to promote revegetation. Reclamation frequently involves neutralization, containment, and/or disposal of process materials, by-products, and waste; removal of facilities; and, revegetation of the disturbance to a declared productive use.

Reclamation does not seek to restore the land to its original condition. Its purpose is to minimize the potential for environmental damage to insure that disturbed lands may be productively used in the future. Futhermore, reclamation is a continuing process that seeks to fully heal disturbances over a period of time. For example, mature trees cut from a forest as part of road construction are replaced with seedlings that ultimately grow to replace those that were harvested during project operation. As such, reclamation is not the equivalent of landscaping as it is practiced with commercial developments such as subdivisions, shopping centers, and office buildings.

Mineral Exploration and Its Reclamation

Mineral exploration is the search for mineable orebodies. In most cases it causes little disturbance and, hence, has relatively little impact upon the land. Mineral exploration takes place in a manner over a period of several years with each succeeding step dependent upon progress or success being made with prior work. The main steps in the exploration process are:

1. Acquisition of the exploration property by purchase, lease, or claimstaking on lands open to mineral entry. Claimstaking is basically a surveying project during which the claims are measured, located, and the corner points marked, generally with a 4 x 4 timber staked into the ground.

2. Geological mapping and reconnaissance level examinations using geomagnetic surveys and geochemical sampling. This phase inventories the area's main geological features and seeks to identify potential exploration targets by identifying magnetic or soil anomalies that may indicate the presence of mineralization. These processes are very unintrusive and cause no surface disturbance except for the collections of small (4-6 ounce) soil samples for analysis.

3. Discovery drilling. Examination of the subsurface geology begin at this point. Holes are drilled in target areas with the intention of locating mineralized zones, examining the area's stratigraphy and assessing potential mineral values. If the mineralization is located near the surface, trenches may be excavated to accomplish similar purposes. Providing equipment access to the exploration area may require the development of crude access roads (10-16 feet wide) and the leveling of drill pads (about 20 x 60 feet in size) for equipment operations. The construction of access roads and drill sites is preceded by topsoil salvage for post-project reclamation.

4. Delineation Drilling and Bulk Sampling. This stage of development is undertaken only if a mineral discovery has been made. It's purpose is to carefully delineate the size and quality of the mineralization and provide a sufficient quantity of sample to accurately characterize its metallurgical characteristics. During this phase drilling will be done in a closely spaced pattern (i.e. a grid with 100 foot contours), underground entries developed, and bulk samples of up to several thousand tons excavated. Surface disturbances can include additional access roads and drill pads, underground openings, small open pits, and the construction of waste rock storage areas. Again, by the time a project reaches the stage of delineation drilling and bulk sampling, several years of work and evaluation have passed and hundreds of thousands, if not millions of dollars, spent on the effort. At this point, the liklihood of finding a mineable orebody has improved to something like a 50:50 probability. Very, very few mineral exploration projects reach the stage of delineation drilling and bulk sampling. Fewer still go on to become mines.

The reclamation of mineral exploration facilities is provided for in the approved Plan-of-Operations and major reclamation tasks can be successfully accomplished without herculean efforts. The usual process includes:

1. Plugging drill holes with rock cuttings, bentonite, or concrete and capping the hole with some type of plug, usually concrete.

2. Backfilling trenches and underground openings with excavated material.

3. Retrieving sidecast fill material on roads to return the disturbance to its approximate original contour.

4. Grading drill pads and other disturbed areas to blend with the adjacent topography.

5. Replacing topsoil over disturbed areas.

6. Revegetating sites with grasses, shrubs, and trees.

7. Monitoring the sites to insure reclamation success. Additional treatments such as reseeding portions of area and spraying noxious weeks may be necessary from time to time.

Mineral exploration is neither an equipment or manpower intensive process. A typical exploration project requires the use of a bulldozer, a backhoe, drill rig, water tank truck, and a general utility vehicle such a pickup truck or 4-wheel drill vehicle. Drill crews generally range in size from three to five persons. Mineral exploration constitutes a temporary disturbance to the landscape. Most drilling projects take less than a month's time unless the operator is successful in locating a mineralized structure that warrants continued exploration. Mineral exploration does not involve the use of toxic chemicals or process reagents. Problems such as contamination of groundwater supplies, acid generation, or surface subsidence are extremely rare.

Mining and Reclamation

Mining is the process of extracting ore grade mineralization from the earth for the ultimate recovery and commercial sale of the mineral. In the United States, facilities to beneficiate raw ores are usually located at or near the point of mineral extraction. As such, a mine usually includes one or more excavations (surface and/or underground) where the mineral is severed from the earth, waste rock repositories for barren material that must be extracted to recover the ore, a concentrator, leaching plant or other type of processing facility to liberate the mineral from the host rock, a tailings impoundment or spent ore pile(s) to contain wastes from the ore processing circuits, and associated offices, laboratories, warehouses, shops, and utility systems necessary to support the mine.

Reclamation of mine facilities is a larger, more complicated task than it is with mineral exploration projects. The reclamation sequence generally includes:

1. Removal of all erected surface facilities such as buildings, conveyor systems, tanks, utilities, and roads unless another beneficial use can be made of the facility.

2. Process solutions are neutralized and either evaporated or applied to specifically designated land application areas with the capacity to attenuate any remaining harmful substances such as heavy metals. The actual process of solution neutralization depends upon the type of metallurgical process employed at the mine.

3. Tailings basins, if any, are dewatered. This process usually is done concurrently with solution neutralization and may take several years.

4. The slope of waste rock depositories are graded to promote drainage and insure stability. Waste rock with the potential to generate acid may be encapsulated with a non-acidic material or treated with lime or other commercial project to retard acid production.

5. At open pit mines, pit walls are stabilized to reduce the potential for mass failure. Depending upon pit location and design, selective backfilling may be done to promote drainage. At underground mines, any surface openings are plugged with backfilled rock and, usually, concrete seals. Safety berms and fences are erected as necessary.

6. Diversion structures and ditchwork are either erected or removed as necessary to promote proper drainage from the site.

7. Disturbed areas are retopsoiled with material salvaged during project construction and held in stockpile for reclamation.

8. Revegetation is accomplished using grasses, shrubs, and trees. The majority of mines in the western United States are located on lands whose primary pre-mine use includes livestock grazing and wildlife habitat. The reclamation plans for such facilities are oriented toward reestablishing those uses.

9. Site monitoring continues until the reclamation program has met its objectives and the reclamation bond is released.

Backfilling Open Pit Surface Mines

At present, open pit metal mines are not usually reclaimed by backfilling the excavation, as is the case with many surface coal mines. There are four principal reasons why:

1. Metallic orebodies tend to be vertical rather than horizontal structures and plunge into the ground rather than occur on a plane parallel to the surface of the earth. The extraction process requires continued deepening and widening of a single excavation with the removal of waste rock to repositories removed from the immediate mine site. Backfilling cannot proceed until the excavation is completed, perhaps for several years. Then the overburden would have to be remined and hauled back for the pit for disposition. In contrast, surface coal mines are generally excavated through a series of box cuts (trenching) with the overburden from one excavation used to backfill the adjacent cut. As such, backfilling takes place as part of the mining process.

2. Metal mines usually cease operations, not because the orebody being mined is physically exhausted, but because it is no longer economical. Mine excavations that are backfilled can be burying low grade material that may not be currently economic but which could become viable in the future with improvements in metal prices and/or mining and metallurgical technologies. As such, backfilling an open pit to accomplish a reclamation goal could lead to the waste of a natural resource by preventing its economic extraction at some time in the future.

3. In almost all cases, the cost of backfilling an open pit is prohibitive. The exception to that rule may occur when two or more orebodies can be mined sequentially with overburden from one excavation used to backfill the other; a situation structurally similar to current practice in some surface coal mines.

   The usual case, however, would require remining overburden from waste responsitories and transporting it to the open pit as backfill, a very expensive process. For example, in 1989 Pegasus Gold mined a total of 51.7 million tons of material (ore and waste) from its six operating mines. The direct cost of mining which exludes all capital investment, of all debt service, administrative overhead, exploration, ore processing, and marketing expense; and taxes, totalled $ 50.8 million or $1.02 per ton of material. In contrast corporate net profit totalled $9.8 million or $0.19 per ton of material. Backfilling our pits would cost $ 0.83 per ton more than the corporation earned, and would, if required, by State or Federal statute, lead to the closure of the mines and bankruptcy of the firm. Other mining companies have different costs and profit margins but there are few, if any, who can afford to backfill open pit excavations.

4. While open pit excavations may be unsightly to some, in relatively few instances do they pose a threat to human health or safety or to the natural environment. The principal environmental threat from abandoned open pit mines, is the potential accumulation of water which may or may not contain deleterious substances. That situation does not apply at all mines since many are above the ground water table and/or are free draining.

   Reclamation of open pits does not require backfilling. Slope stabilization accompanied by the revegetation of rock benches on the pit walls can ultimately yield a land form and habitant similar to natural mountain sides, with talus slopes and cliffs.

The Regulatory Framework

The existing system of mineral regulation be it at the state, federal, or local level largely achieves its goals of minimizing the environmental impact of mineral exploration and mining activities. Mining was, however, virtually unregulated in any sense until the 1960's. As a consequence, there are many examples of past mining activities that scarred the landscape or contributed to contamination in some degree. The confusion of that legacy with current operating and reclamation practice has created an atmosphere of misinformation about the effects of modern mining on the environment. While the industry's critics are now raising an alarm over surface mining practices and cyanide heap leaching, a close examination will reveal very few instances of significant environmental harm from modern mines. To be sure, there have been both accidents and problems but the industry has responded proactively and quickly to resolve such matters and either limit or correct any damage.

There is little need for a major federal initiative in the areas of metallic mineral reclamation. If Congress wishes to improve federal regulation of the metallic mineral industry, it need look no further than the mineral and geology budgets of agencies such as the Forest Service and Bureau of Land Management. Those agencies have a large responsibility and given the cyclical nature of the mining industry, face continuous fluctuations in their minerals related workloads. There is a need for more minerals staff officers and a substantial need for minerals related training among the resource specialists called upon to assess the effects of proposed mineral development and to assist the mineral developer meet the requirements of his permit(s) and minimize environmental impacts.

Providing federal land management agencies with a budget adequate to fully support their minerals programs will greatly alleviate any existing deficiencies in the administration of current federal laws or regulations pertaining to mining.

Senator **Bumpers**. Mr. Parks.

Thank you very much, Mr. Fitzpatrick.

STATEMENT OF RICHARD PARKS, SECRETARY, NORTHERN PLAINS RESOURCE COUNCIL

Mr. **Parks**. Thank you, Senator Bumpers, Senator Burns.

My name is Richard Parks. I own and operate a sporting goods store and fly fishing outfitting service in Gardiner, Montana at the north entrance to the Yellowstone National Park. I am also the secretary of the Northern Plains Resource Council, a Grassroots organization in Montana of 6,000 members and supporters and affiliated in turn with sister organizations in North and South Dakota, Wyoming and Colorado through the Western Organization of Resource Councils.

A lot of what I want to say has already been touched on in one way or another, and I will summarize this fairly quickly. It is true that the mining industry has improved considerably since 1872. I do not think it is quite true to portray the modern mining industry as having totally cleaned up its act.

One of the things that has been said here is that sometimes bonds are claimed. In Montana, the state puts out bonds, because Montana has recognized as a state that is often cited as having the most stringent mining laws around, and as a consequence, through the IMU's that were mentioned by the federal people, the state generally does set that bond. And as you know, the bonds in many cases have turned out to be inadequate. In fact, I cannot think of a case in which it has been necessary to exercise the bond that it has turned out to be in fact adequate.

The bond is set theoretically on the basis of actual of costs of reclamation. In fact, it is done with a cook book of construction costs and standards which still makes inadequate provision for particular site specific circumstances: high altitude, proximity to water courses, the exact chemical nature of the soil at hand.

And another major feature of the bonding standards being applied is that they address almost exclusively the requirements to reconture and stabilize the immediate surface of the mining site. They address almost not at all water quality, ground water in particular, and surface water only to the extent that by stabilizing the surface area, you are likely to prevent immediate gross erosion by working on leach pads and so on to try to reduce immediate leaching.

This itemized construction business, as I say, then is still a somewhat rigid process that does not take sufficient requirements. If we want to look at a modern mining operation that is sometimes cited as being exemplary, the Golden Sunlight Mine near Whitehall failed to install a retaining wall in their tailings impoundment, which resulted in the release of millions of gallons of cyanide contaminated water.

This is an active mine, permitted under the current rules and is, in fact, in the process of applying for an expansion to their operation. That expansion will produce a 2,000 foot high headwall, a 225-foot-deep lake at the end of operations with water in it. It is estimated to reach pH 2.4. This is substantially acidic and will be well-laced with acid, heavy metals and so on. That lake will intersect the ground water.

And yet in spite of all that, the reclamation bond is going to be increased substantially. The prospect is to increase the reclamation bond for the site from $1.7 million to $8.1 million. But the bond provisions and the reclamation plan at present only provide for water monitoring for 10 years after the mine closes, and treatment of water from the tailings impoundment for 3 to 5 years.

I find if unlikely that the problem will not continue to exist after this point. So I think what we are doing right now is creating the historical conditions to be looking, again, at exactly what we are looking at now with the unreclaimed situations that are seriously out there. The things we need to have: a royalty payment, going in to an abandoned mine fund to clean up. We are making more trouble for the future much less getting a serious start on cleaning up the past. And we need to resolve that problem.

Thank you.

[The prepared statement of Mr. Parks follows:]

Northern Plains Resource Council

STATEMENT OF RICHARD PARKS ON BEHALF OF THE NORTHERN PLAINS RESOURCE COUNCIL BEFORE THE SENATE SUBCOMMITTEE ON MINERAL RESOURCES DEVELOPMENT AND PRODUCTION

APRIL 19, 1990

Chairman Bingaman, Senator Bumpers, members of the committee, for the record my name is Richard Parks. I own and operate a sporting goods store and fly fishing outfitting service in Gardiner, Montana at the north entrance to Yellowstone National Park. I am also Secretary of the Northern Plains Resource Council (NPRC), a Montana grassroots citizens organization of 6000 members and supporters. Since our inception in 1971 NPRC members have worked to protect Montana's agricultural economy, rural commununities and environment from the inevitable impacts of natural resource development. Many NPRC members live in areas directly impacted by hard-rock mineral mining. I am testifying on behalf of NPRC today. NPRC in turn is affiliated with the Western Organization of Resource Councils (WORC) which is made up of NPRC's sister organizations in North and South Dakota, Wyoming and Colorado.

Regulation of the mining industry has improved since 1872. Federal and state laws have strengthened agency authority to regulate mining. However, the 1872 Mining Law undermines these regulations and hamstrings agency authority. This law remains as a roadblock to a responsible, comprehensive mine regulatory program in this country. Under the current system, abuse of public lands, and environmental horror stories continue to occur. Modern mining practices, spills and accidents continue to pollute land, air and water resources. Ineffective and inconsistent laws and regulations, riddled with loopholes, allow even heavily regulated operations to damage our fragile natural resources in Montana.

Montana is often cited by the mining industry as the state with the toughest permitting system and reclamation standards. A look at bonds for five major mines in Montana reveals, however, that many considerations we believe to be important for reclamation and bonding are ignored or inadequately addressed. The Montana Department of State Lands uses an itemized construction estimate method to determine bond amounts. The following are typical reclamation activities for which bonds are required:

- earth moving, i.e., recontouring; road regrading; soil replacement; seedbed preparation; backfill of ponds;

*demolition and removal of facilities;
*treatment of process water at cyanide heap leach mines;
*revegetation.

You will hear that current reclamation and bond regulations are strict enough to ensure safe mining operations. However, significant environmental damage continues to occur from all stages of mining development. This method of determining construction costs used by the state makes no allowances for variations in site specific factors such as high altitudes (fragile alpine areas) or proximity to water resources. Further, these bonds completely fail to address the consequences of lost or contaminated ground and/or surface water during and after mining. Several cases in Montana serve to illustrate these points.

OPERATING MINES

Damage to water resources occurs even at well managed mines. The Stillwater Mine, near Nye, Montana, is an underground platinum/palladium mine with a good track record on environmental matters. Nevertheless, in 1988 the drilling of an exploration adit with a 13 foot diameter tunnel boring machine ruptured an underground spring, permanently drying up a surface creek and waterfall on the land of a nearby rancher. The effect of this on the hydrology of the area is unknown.

Although Montana law requires mining companies to replace water in like quantity and quality if operations adversely impact nearby water users, the water resource in this case will never be replaced because the mine simply bought out the rancher in an out-of-court settlement. The mine's reclamation bond did not consider such impacts to water resources. While the rancher was monetarily compensated for the loss of his water, the stream remains dry.

The Golden Sunlight Mining Company opted for this same "solution" at its mine near Whitehall, Montana. The company failed to install a retaining wall in a tailings impoundment which resulted in the release of millions of gallons of cyanide-contaminated water into the groundwater. This spill contaminated the drinking water supply of two nearby landowners, but once again the company negotiated an out-of-court settlement rather than replace or clean up the polluted groundwater. Golden Sunlight never admitted that the spill caused the contamination. The cyanide remains in the groundwater.

In neither of these cases did the reclamation bonds require clean-up of the contaminated groundwater or restoration of the dewatered spring. The bonds only addressed post-mining monitoring for contamination, and treatment of tailings pond water. Nothing existed to provide incentive for the companies to take adequate measures to avoid or repair damage to water resources.

Not all mining operations in Montana even fall under state reclamation regulations. Under present Montana law, miners who disturb less that 5 acres, or remove less than 36,000 tons of rock annually, are exempt from bonding and reclamation requirements. Many of these operations exist, unregulated, and cause significant damage to water resources.

Posing an even larger threat to Montana'a waters are the recent petitions by mining companies for exemptions from Montana water quality standards. Current state law contains a non-degradation policy for state waters, which prevents any degradation of water quality below existing water quality conditions. However, there is a loophole in the law that allows the Montana Board of Health to grant exemptions from the non-degradation policy if a company can show that an exemption would be "justified as a result of necessary economic...development...." Both ASARCO and Noranda Minerals Company have submitted requests to the Montana Board of Health for such exemptions for their mines adjacent to the Cabinet Wilderness in northwestern Montana. Granting an exemption for hard rock mines to degrade water quality of Montana streams would set a dangerous precedent for regulatory policy for mining in the state. Granting these exemptions will pave the way for several other large scale mining operations to petition for exemptions as well.

HISTORIC MINING: LEGACY OF POLLUTION

Near Cooke City, Montana, Noranda Minerals Company is exploring several promising ore bodies for gold. These ore bodies are located in a sensitive alpine ecosystem stradling three watersheds: Soda Butte Creek, which flows into Yellowstone Park; the Stillwater River, which flows into the Absaroka-Beartooth Wilderness; and the Clark's Fork of the Yellowstone, a Wild and Scenic River candidate. These three streams eventually flow into the Yellowstone River, the last major free-flowing river in the lower forty-eight states. The Yellowstone is the life blood of both the agricultural and recreational economies of south-central and south-eastern Montana.

The Cooke City area is also an historical mining district which continues to generate serious acid mine drainage from mining that took place decades ago. The contamination so threatens Yellowstone Park that the Environmental Protection Agency has engaged in an emergency clean-up of some old mill tailings that are discharging toxic heavy metals into Soda Butte Creek. This EPA project at the "McLaren" tailings site near Cooke City barely scratches the surface of the problem in this area. The nearby "Glengarry" adit discharges water so low in pH as to approach that of industrial acid. This example graphically illustrates what can occur when a mining company is not held responsible for mine reclamation.

INSUFFICIENT BONDS

Even in cases where bonds are required, and reclamation plans developed, serious environmental damage can remain when companies forfeit bonds which turn out to be insufficient to reclaim the land. In several instances, companies have forfeited bonds, leaving the state responsible for cleaning up contamination from spills or irresponsible operating practices.

*The "Intergem" mine in the Little Belt Mountains in central Montana had a bond of $71,600 posted in 1982. Two years of mining resulted in damage that the state estimates will cost $218,000 to reclaim. The site is currently unsafe and hazardous. State officials could only comment that "I would guess at the time the bond was adequate." (Great Falls Tribune "State: Bond Won't Cover Reclamation," 6/18/89.)

*At the Quartz Gulch placer mine in western Montana, the company had to post an addtional $17,600 bond to cover costs of reclamtion work supposed to have been completed under the original bond of $3,200. (Anaconda Leader "Controversial Mine Leased, New Bond Posted," 1/17/90.)

*At the Golden Maple Mine near Lewistown, Montana, cyanide from a heap leach operation was released into the groundwater, contaminating a nearby ranchers water supply. The company's reclamation bond of $36,500 was grossly inadequate to clean up the site. The state estimated the cost of "minimal" surface clean up to be $115,000 to $120,000. (Lewistown News-Argus, "State To Spend $115,000-$120,000 To Clean Up Mine Site," 7/27/86)

*The Nellie Grant Mine 20 miles southwest of Helena, Montana, was abandoned in 1982 after the mining company, Sparrow Resources Ltd., of Canada, folded. Bonds originally posted by the company were insufficient to cover reclamation costs. The state has already spent $60,000 on reclamation work at the site, which is contaminated by heavy metals, cyanide and arsenic. The company also left behind over $200,000 in fines for water quality violations. (Great Falls Tribune "After the Gold Work," 6/30/88.)

RECLAMATION, BONDING PROCEDURES INADEQUATE

Mining operations, by their very nature, will continue to cause damage to productive lands and water resources, even when current regulations are adhered to. Several large mines in Montana, often cited as responsible operations that take extra steps to ensure environmnetal protection, will nevertheless inevitably cause significant long-term impacts to the environment.

The Golden Sunlight open-pit gold mine (see above) illustrates this point. Latest expansion plans for the mine will result in a 1,200 foot deep pit, with one 2,000 foot highwall, that will fill with water. This lake will be 225 feet deep, and sit below the water table. The water will have a pH close to 2.4 and contain high levels of heavy metals and salts, and will flow from the pit toward the pristine Jefferson River.

For this expansion the bond is expected to be increased from $1.7 million to $8.1 million. However, the current provisions of the bond include only the following for water protection:

*water monitoring for up to 10 years after the mine closes; and
*treatment of water from the tailings impoundment for 3 to 5 years.

These are the only water-related activities covered by the bond, in spite of the fact that the state's own environmental analysis of the original project, done in 1981, acknowledged that "the potential threat of hazardous substances entering the surface and groundwater systems of the area was an unavoidable adverse impact." (Montana Department of State Lands, Environmental Assessment, Golden Sunlight Mines, Inc., p.10, June 1989) Curiously, the Golden Sunlight was recently touted in the Montana press as being '...one of the showcase operations with elaborate environmental safeguards..." (Billings Gazette, "Land Ethic Part of Modern Mining." 4/11/90)

NPRC and others are concerned that the attitude recently expressed by the former chief of the Montana Hard Rock Bureau will place all water resources in the state at risk. He stated that "state officials are more concerned about land reclamation than water contamination." (Quote from Department of State Lands Hord Rock Bureau Chief Kit Walther, Montana Standard, "Gold Mine Cyanide Use Worries Residents," 6/24/89.)

The Noranda Project near Cooke City (see above) has a $47,100 bond for its exploration work, which covers the costs of reclaming 19 drill pads and 2700 feet of road. A long-term USFS reclamation study in the area raises serious doubts about the reclaimability of the proposed mine site under any conditions for any amount of money, primarily because of its high altitude. According to a Forest Service reclamation specialist, for this alpine area it would probably cost "...about $10,000 to $12,000 per acre to initiate a rehabilitation effort...and with this there has to be the realization that we are only initiating the primary plant successional process." Initial succession of plant species in this area could take up to 30 years. (Hard Rock Minerals Policy, Northern Plains Resource Council, September, 1978) In spite of this alarming assessment, the regulating agencies have no authority to say "no" to the project.

The Stillwater Mining Company plans a large platinum mine on the East Boulder River drainage, 35 miles south of Big Timber, Montana. The company plans to use a 16 foot diameter tunnel boring machine to drill an exploration adit that will undercut two creeks. As with the destruction of the creek and falls near Nye (see above), neither state nor federal reclamation and bonding requirements will protect the creeks from this drilling should they be destroyed. At best, the bonds will only provide for water monitoring when the mine closes.

In our review of bonds and reclamation practices for several large-scale mines in Montana, NPRC arrived at several conclusions about reclamation and mining regulations in general:

1) Bonds and reclamation do not go far enough to protect all resources impacted by mining. Bond amounts are determined by construction costs that make no allowance for site specific factors such as high altitude or proximity to water resources. They focus primarily on surface disturbance and revegetation. Nor do current reclamation bonds adequately consider the potential losses of water resources.

Reclamation bonds do not now include specific criteria for revegetation success. Such criteria are essential in determining when bonds are released by the state. Minimum timeframes by which reclamation is considered successful should also be set.

Reclamation bonds should also provide protection for water resources from the great potential for damage that mining can present. No bond NPRC has reviewed provides for clean up of water contamination caused by spills, accidents, or faulty operating procedures associated with mine operation or mine closure. The cases cited above argue strongly for reform that ensures that reclamation bonds would protect or replace water resources and not merely stabilize the surface. Such reform should also consider that groundwater contamination may take several years to become evident. These reforms would provide incentive to protect water from the outset of mining.

2) Bonds do not consider revegetation or recontouring failure. In all the cases NPRC examined, reclamation bonds did not consider any costs for additional reclamation work should original reclamation or revegetation fail. As seen in the Cooke City example, reclamation efforts that have been ongoing for over 30 years have only met with minimal success.

3) Bonds must be periodically reviewed and adjusted for inflation. Many mines have lives of 20 to 30 years, so agencies need to consistently adjust reclamtion bonds to account for inflation.

REFORM OF THE 1872 MINING LAW IS ESSENTIAL

In general, federal mining policy should be reformed in several areas to strengthen agencies authority to ensure proper reclamation and bonding. In attempting to ensure that adequate protection exists for multiple uses of the public resources such as grazing, recreation and watersheds, we have continually been frustrated by the absolute pre-emptive nature of the General Mining Law of 1872.

1) Agencies should be given authority to deny mining project based on unsuitability criteria. As is provided with coal mining by the federal Surface Mining Control and Reclamation Act (SMCRA), agencies should be given the discretion to declare areas unsuitable for hard rock mining. This decision would be based on unsuitability criteria that would help to balance mining with other multiple uses of public lands. A prime criteria should be the potential for successful reclamation of both surface vegetation and water resources. As the Cooke City example illustrates, reclamation obstacles such as high altitude should raise questions as to whether mining is a suitable use of the land.

2) The patent system should be eliminated. Meaningful reclamation and bonding standards demand that the patent-claim system be eliminated, as it makes a joke of the planning and decision making processes of the public land managment agencies. The patent system reduces agency choices to deciding which other multiple uses will be curtailed in order to accomodate mining at any cost. Giveaway of public lands inhibits land manager's ability to ensure proper reclamation. A leasing system, in which companies pay a fair royalty for taking public resources, should be instituted.

3) A hard rock abandoned mine lands program should be established. Money generated by a leasing system can be used to enforce reclamation standards, and to clean up the many thousands of abandoned mine sites still unreclaimed. The Montana Department of State Lands has cataloged over 2400 abandoned mines in the state, and expects that number to reach 5000 before they are done counting. State resources can not even begin to deal with the immediate threats to health and safety this list represents, let alone the long term impacts on environmental quality.

4) Implement an applicant violator tracking system. This will allow agencies to track companies with a history of forfeiting bonds and abandoning their reclamation efforts. Companies who have forfeited bonds should be denied permits to mine until complete restitution is made.

It is NPRC's hope that our testimony here today will further convince members of Congress of the urgent need to reform the 1872 Mining Law. Proper reform will provide consistent standards for mine operation, reclamation and bonding to ensure that the environmental disasters of the past are cleaned up, and that future disasters are prevented. Reform must also promote prudent financial management of public resources. Without these changes, hard rock mining will continue to create financial and environmental liabilities today that future generations will be forced to contend with tommorrow.

Thank you Mr. Chairman for this opportunity to give the Subcommittee NPRC's perspective on these important issues.

Senator BUMPERS. Thank you, Mr. Parks.
Dr. Miller.

STATEMENT OF DR. GLENN MILLER, PROFESSOR OF BIOCHEMISTRY, UNIVERSITY OF NEVADA, RENO, NV

Dr. MILLER. Thank you, Senator Bumpers, Senator Burns.

My name is Glenn Miller. I am a member of the faculty of the University of Nevada, Reno. I am also chairman of the Sierra Club Subcommittee on Mining and a resident of Reno, Nevada.

I have been involved in mining issues for approximately 10 years as a member of the environmental community. Recently, I participated in development of the mining reclamation legislation for the State of Nevada and at the present involve in development of implementing regulations mandated by that legislation. I have also commented extensively on BLM and the U.S. Forest Service environmental documents in regard to mining. These comments represent my personal views.

I would like to summarize my comments by making three points in regard to mining reclamation. The first point I would like to make is that problems do exist. In my State of Nevada, which I am most familiar with the old problems that have been referred to, Ruth, copper pit—unreclaimed major disturbances—primarily, on private lands, I might add. And then many, many examples of historic mining in the Comstock area, Gold Fields, TONOPAH and around the state. But I also would suggest that those problems are going to be minor in relation to the new kinds of mining that is presently going on presently.

With gold at as low as hundredth of an ounce per ton, the amount of rock you have to move in order to get an ounce of gold out is really very, very large.

Senator BUMPERS. How much is it, Dr. Miller? I have seen different figures.

Dr. MILLER. Well, it will vary. And I think the Newmont representative has a better handle on that than I do. But on the order, I am told, that a hundredth of an ounce per ton is about as low as you can go. And if you look at stripping ratios that can go from three to 10, you can look at well in excess of 100 tons of rock being moved for one ounce of gold, and that can go up to more than that.

So it is—we are moving in Nevada several hundred million tons of rock per year for mining. That is a tremendous amount of disturbance and it frankly dwarfs mining that existed in the glory days of the Comstock era—have approximately 100 separate significantly large mining operations in Nevada depending on how you put the numbers together. Some of those are very, very large indeed.

One example which is being considered right now on public land is the Barrick Goldstrike operation. It will be—the amount of rock moved will be approximately 1 billion tons, which makes it one of the very largest in Nevada. Over a mile across the pit will be 1,400 feet deep. And when it fills up with water to a level 300 feet from the surface, it will be the largest manmade lake in Nevada and will affect the hydrology of that ground water basin for as long as any of us care to think about it—certainly, thousands of years.

I think that there are several examples of that, that are going to occur in that nearby area along the Getchel trend and certainly in other areas that are maybe less intense but certainly exist throughout Nevada. We are going to do things that are going to affect land use decisions for the next several thousand years. And I think it is important that we think very, very carefully before we do that.

So the point is that there are very, very significant disturbances that are occurring on lands with the new, especially, precious mineral mining.

The second point I would like to make is the BLM particularly does not—has not had a history of requiring good reclamation. And I would argue very strongly that federal legislation is needed to require reclamation. The Federal Land Policy Management Act of 1976 requires in section 302(b) that the secretary shall by regulation or otherwise take any action necessary to prevent unnecessary or undue degradation of the lands.

That is all of the federal legislation that I am aware of that affects reclamation of hard rock mining. And if you think about that and read that in an even short amount of time, I think, you will agree that that is open to a wide amount of interpretation.

We would argue in the conservation community that means, best available technology, that anything that is possible should be reclaimed. The BLM argues, I think and its regulation says, that anything that is consistent with normal reclamation is—normal mining—is okay. And the difference between those is dramatic.

I have got one picture, I might, show you that shows some of the angular repose dumps that occur in Nevada—something that is very, very difficult to reclaim over the long term. I would also argue that BLM is not abiding by the Environmental Policy Act. I have got a specific example in my testimony which I will not go into. But the primary problem is that no environmental impact statement has been written on any mine in Nevada on BLM managed land. And even though we had some of the largest mines in the country that is not seen fit to develop the proper environmental documentation.

The last point I would like to make, which is one that is really important. You can require all the reclamation that you want, but if the agency does not have discretion to prohibit mining in certain areas, all those reclamation regulations will not be worth very much at all. The agencies must be able to say no under certain sets of circumstances where other values are much, much greater.

Right now, if all that was done was reclamation regulations were increased without giving agency discretion, a mining company could come back and say that by requiring this high level reclamation, you are effectively prohibiting us from mining, the 1872 law says you cannot do that and, therefore, we are not going to reclaim, and we will take it to court. And I think the agencies would be under a very—in a very difficult position to say no.

Finally, I just want to make a point. Ultimately, the land is always worth more than the gold. This is even at the very rich bodies of ore that we have in Nevada, if you extend this over several thousand years, which is what you are going to have to extend this over, the land is always going to be worth more. And I think we owe it to our people that come after us, the generations ahead of us to make sure that our decisions do not preclude land use decisions by then.

Thank you.

[The prepared statement of Dr. Miller follows:]

Testimony of Glenn C. Miller, Ph.D.
Before the
Subcommittee on Mineral Resources Development and Production
of the
Committee on Energy and Natural Resources
regarding
Reclamation and Bonding Practices on Hard Rock Mining

April 19, 1990

My name is Glenn C. Miller. I am a Professor of Biochemistry and Chairman of the Environmental Studies Board at the University of Nevada, Reno. I am also chair of the National Sierra Club Subcommittee on Mining and am a resident of Reno, Nevada. I have been involved in mining issues as a member of the environmental community for the past ten years. Recently, I have participated in development of mining reclamation legislation for the State of Nevada during the 1989 legislative session, and at present am participating in the development of implementing regulations mandated by that legislation. I have also commented extensively on BLM and USFS environmental documents in regard to mining. The following comments represent my personal views.

I am pleased that reclamation and land use planning are being discussed in relation to hard rock mining on the public lands. In my home state of Nevada, gold and silver mining has undergone a very large expansion in recent years and is now a two billion dollar industry each year. Approximately 100 separate mines are in operation and are creating substantial surface disturbances. The methods used to reclaim those lands will affect people for centuries. Great care must be taken when making land use decisions which preclude productive uses of mined land for those time frames.

The lack of adequate hard rock mine reclamation is one of the major problems on the public lands of Nevada and is the issue which I wish to address. Reclamation of lands disturbed by hard rock mining is not adequately considered in any federal legislation, and should be treated in a comprehensive manner in any new mining legislation.

During our discussions of a reclamation bill in Nevada, a member of the industry appropriately defined reclamation as being composed of three primary issues. They include environmental safety, land productivity and aesthetics, and are briefly defined as follows:

Environmental safety: Any reclamation plan must ensure the physical and chemical safety for humans and wildlife. The obvious physical safety problems of falling into 500 foot drops in an area that is otherwise comprised of gentle hills must be precluded. Less visible, but equally important are the chemical hazards associated with mining. Mercury used during Comstock mining days still contaminates fish in the Carson River of Nevada, and acids and toxic metals from mining in Montana and Colorado have destroyed many miles of fishing streams. Current precious metal mining has its own set of chemical problems, from heavy metal and cyanide extraction processes. Any reclamation effort should preclude release of any of these toxins to those levels that existed prior to mining.

Land Productivity: Following reclamation, the land should be able to support the same level of productive uses as existed prior to mining, including wildlife, agriculture and recreation. Return of lands to productivity will not happen without effort, particularly in the arid west. Many disturbances created over one hundred years ago remain barren waste rock dumps without useful vegetation. Careful management of topsoil and encouragement of plant growth is essential.

Aesthetics: Dumps and other land carvings should be recontoured to conform to the surrounding land. Flat-topped, angle-of-repose dumps should be recontoured to an aesthetically pleasing form and integrated into the natural topography. With all due respect to mining engineers, their opinion of what is visually acceptable is based more on economics that visual quality, and has too often resulted in large-scale downright ugliness. Yet it is the mining engineer who usually determines the final shape of mined public lands, and not a landscape architect.

Impacts from mining activity occur in all phases of mining, beginning with exploration, mine development of pits and waste rock dumps, and finally processing of ore which results in the leached heaps and tailings impoundments. The type of reclamation required for each phase of mining will vary on a site specific basis, but I firmly believe that any new legislation must give a much clearer policy direction on reclamation than presently exists. This legislation must give unambiguous policy direction to the agencies which will encourage creative approaches to reclamation, and require them to approve only those mining plans that protect the public resources.

For example, exploration impacts generally consist of a cobweb of roads and drill pads. These roads often switchback up a mountain, cross streams and create channels for erosion. When flying over Nevada, more exploration damage is apparent than actual mining. However, with proper planning and regulatory enforcement, these impacts can either be avoided or completely reclaimed to the original contour of the land. Unless the agency has a clear reason to retain a road, exploration scars can and should be completely eliminated. Legislation can explicitly require restoration of exploration impacts back to the original condition.

Pits and Waste Rock Dumps

For waste rock dumps and pits, reclamation is likely to take on different forms, which involve contouring of disturbances into the natural landforms. Hard rock mining in Nevada involves digging large holes in the ground (pits) and putting the rock removed from the pits somewhere (waste dumps and ore). Revegetation standards should require a return to pre-mine productivity levels for the post-mine land use. For these greater disturbances, agency discretion may be appropriate, but clear policy direction on reclamation goals should be given in legislation to a much greater extent than presently exists.

Refilling of pits is a very visual issue which receives a large amount of public attention. Bringing up this issue also pushes the proverbial sensitive button of the mining industry. Although pit refilling is perhaps not the most important issue of reclamation, the sheer magnitude of some of the pits deserves comment.

Many of the pits being created in Nevada will exist for literally thousands of years. In the absence of refilling, the time frames for natural recontouring are the same as those for recontouring the impacts of meteorites striking the Earth, since the depth and amount of earth moved are in many cases comparable. Some of the pits along the Carlin and Getchel trends in Nevada will drop to over 1000 feet below the surrounding landscape. The Barrick Goldstrike pit will be 1400 feet deep and require removal of a billion tons of rock. When water infiltrates into the pit over several decades, it will form the largest manmade lake completely in Nevada. This stagnant body of water will be unlike any in the state and will permanently affect the hydrologic characteristics of that groundwater basin. Other nearby mines promise to be nearly as large and may, in fact connect with the Barrick Pit.

With very few exceptions, these scars on the landscape are intrinsically undesirable and the burden should be placed on the industry to demonstrate why they should not be refilled. In fact, there are cases where complete restoration of the landscape should be required to protect other public values. Others cases, where resources conflicts may not be as great, can perhaps be treated differently. However, when pits can be developed sequentially and are in reasonably close proximity, the pits should be refilled. State and federal agencies should be given direction to require refilling of nearby pits with rock from new mines. Complete or partial refilling of small pits may be entirely appropriate, and examples of refilling small pits exist in Nevada. Currently, the BLM is unwilling to consider pit refilling as an alternative in the many documents I have reviewed, even though they have that authority under the 3809 regulations.

If present federal land management practices are followed, it is probable that Nevada will have over 200 major pit mines within the next 20 years that will be permanent scars on the landscape. I am not suggesting that all pits be refilled, but I will argue that any activity which causes impacts lasting for many centuries is troubling and deserves careful thought. Over the long term, the land is always worth more than the gold, and we must wonder whether future generations will look back on us and ask why we didn't require those who gained the profit to also restore the land.

More important, however, is the question of what happens to all of the rock that is taken from the pit. When a billion tons of rock is removed, that rock must obviously be placed somewhere. In most cases, the rock is simply dumped in nearby areas, and left as waste rock or tailings. This geologic material has essentially no productive potential, and waste dumps from the Comstock era over one hundred years ago remain devoid of vegetation.

These disturbances are usually the ones that have the most impact on safety, productivity and aesthetics of the resulting disturbed land. Reclaiming dumps, heaps, tailings and other surface disturbance is where the most focus should be placed during reclamation planning and implementation. If the rock is not going to be put back in the pits, it should be placed in areas where it will be stable and not adversely affect other environmental values. We have several examples in Nevada where rock is simply dumped down the side of the mountain. These long angle-of repose dumps are most often unreclaimable and create permanent unproductive land and visual problems. An equally unacceptable option is to create long, flat-topped dumps with angle-of-repose sides which are nearly as difficult to reclaim. As indicated previously, planning for reclamation is fundamental for precluding the problems associated with misplaced dumps.

Once recontouring of the disturbance is accomplished, establishing a productive soil is critically important. Conditions for establishing vegetation in the intermountain west are generally harsh, and substantial effort and planning are required for developing a productive topsoil to allow revegetation. I am not so concerned that all the revegetation be done with native species, since they will invade in a few years anyway. But nothing useful will grow if a suitable growth medium is not present. I have often heard it stated by the industry that topsoil is simply not available and hence they should be allowed to leave the land in a low productivity condition. With all due regard to the intrinsic difficulties of revegetating arid lands, it is simply not acceptable to leave the land barren. Various options do exist for developing topsoil, and the industry needs to look seriously at those issues.

Some geological material has texture which can be used as a base for growth medium. Organic matter, including sewage sludge, straw and nutrients can be added; many success stories exist in this regard, although more research is required. But I will believe that the industry as a whole is concerned about this issue when agronomic resource scientists, foresters, hydrologists and landscape architects are in high demand. Mining engineers are very capable in the area of creating the disturbance, but too often they are not as capable of bringing back the land. Reclamation will be a reality only when the proper reclamation scientists are hired and this will happen only when the agencies, particularly the BLM, require reclamation. They will only require it when given the clear mandate by legislation to do so.

Off-site mitigation is an issue which should be considered also. If a resource is lost due to mining, the company should be allowed (required) to mitigate that loss by performing some other activity that will enhance environmental quality somewhere else. Many examples exist. Purchase of wildlife habitat, as was done by Newmont Mining Company in Nevada is an example. Other possibilities include reclamation of other historically disturbed areas, repair of streams damaged by overgrazing, or purchase and transfer of lands into public ownership which have high public values.

Several examples of excellent reclamation exist in Nevada, which provides confidence that it can be accomplished. The best that I have seen is the Pinson mine north of Winnemucca. This group has created rolling hills of waste dumps that are indistinguishable from surrounding hills, and have been revegetated using soils that support excellent plant growth. The mine is still very active, and will be active for at least another ten years. They are performing reclamation concurrently with mining and are doing a splendid job in a harsh environment. The characteristic that sets this mine apart is the realization that reclamation is intrinsically part of mining, which must be considered throughout the development of the mine, rather than as an add-on at the end.

BLM Mining Policy

I also want to comment on the BLM's 3809 regulations which deal with mining. The Federal Land Policy Management Act of 1976 (FLPMA) requires, in section 302(b), that "the Secretary shall, by regulation or otherwise, take any action necessary too prevent unnecessary or undue degradation of the lands". Reasonable interpretation of this clause would mean that Best Available Technology should be used. Best Available Technology would include clearly defined recontouring and revegetation.

Use of Best Available Technology is not the interpretation of the BLM's 3809 regulations. I have, in fact, been told that by the BLM that this clause of FLPMA rather can be interpreted some degradation is due and necessary. The 3809 regulations set a standard for reclamation of what has historically been the level of disturbance of normal mining. This level of disturbance is no longer acceptable, nor was it acceptable when these regulations were implemented in 1981. One can argue that the BLM interprets the Mining Law as having precedence over the Federal Land Policy Management Act of 1976.

The same case exists with the National Environmental Policy Act. No Environmental Impact Statement has ever been written for a mine primarily on BLM managed land in Nevada. An EIS is presently being written for the Barrick Goldstrike mine, but even in that case, an EIS would probably not be written, except for substantial pressure from the environmental community. In the political world of the BLM, it is often the case that they most closely follow those laws for which they receive pressure. Conversely this is not the case for mining activity on the National Forest, and tighter regulations exist.

In the California Desert one of the main problems with the regulations is that they do not have an objective set of criteria with which to measure reclamation. Any new legislation should have standards which require that the productivity of the land be returned back to the pre-mine levels. Unless they can accomplish this reasonable task, the mine should not be permitted.

I do not wish to engage in the common sport of BLM bashing, and many of the BLM staff in Nevada are capable public servants. The minerals staff in the Elko District are particularly capable, thoughtful and independent. But there is simply not enough of them, and they are stretched thin because of lack of staff, operations support and national BLM policy.

The problem with the BLM management of mining in Nevada is provided by a recent example of an environmental assessment on a major expansion of an existing mine south of Battle Mountain. Because of the limitations of staff most environmental documents are prepared by consultants which are selected and paid by the mining company even though the BLM in theory has control of the final document. In this case of the Battle Mountain Gold operation, the consultant, JBR Consultants, prepared the EA, and the BLM commented on it. The consulting firm then commented on the BLM comments and the EA was then released as a BLM draft document. In at least one case, the consulting firm scolded the BLM for suggesting that annual vegetation, such as thistle, cheatgrass and halogeton, was not acceptable for revegetation purposes. One wonders who was in charge of the process. The total new acreage disturbed by the operation was over 600 acres of public land and 286 acres of private land, in addition to over 3600 acres previously disturbed and unreclaimed from historic mining. On 58 miles of road disturbed only 1 was reportedly reclaimed, yet the BLM did not feel it necessary to go into any detail on road reclamation. The reclamation discussion was non-specific and did not give the reviewer confidence that the new disturbance would be adequately reclaimed, much less the previous disturbance. No bond was required. The final decision was the typical finding of no significant impact (FONSI).

From the conservation perspective, the BLM has a clear track record of not requiring acceptable reclamation nor requiring protection of public values from the impacts of mining. As indicated above, the reasons for this are the lack of a clear national policy and the lack of sufficient agency resources to accomplish the task.

In this regard, I have two suggestions regarding new mining. First, any new mining legislation must be substantially more specific with regard to reclamation and establish clear reclamation goals and mandate workable methods to achieve those goals. Second, essentially all of the major mines hire their own consultants to prepare environmental assessments. Those consulting firms are responsive to the people paying the consulting bill, not the public. Any new legislation should have permit fees paid directly to the responsible agency, as part of a mining plan of operation which will pay the total cost of developing the permit. The BLM can then either hire additional staff or outside consultants who will be responsive to the Federal Agency. Included in the legislation should be language which allows rapid selection of those consultants so that the process for obtaining a permit is timely.

Bonding for mines should be included in any legislation on mining. The Forest Service presently bonds all mines. The BLM presently requires essentially no bonds. Because of the new state reclamation law in Nevada, all mines on both public and private lands will be required to provide financial surety for reclamation as of Oct. 1, 1990. The necessity for surety is self-apparent; when financial resources are held by the agency, the probability of quality reclamation is significantly higher. The type of surety can take on a variety of forms, and cash held in the federal treasury may not be the only method. However, surety was viewed as a critically important issue in Nevada's reclamation statute, and it was included in the legislation that was passed.

Reclamation should be required on all lands, including private lands. There are differences, however, in public and private land uses, and I suggest examining the language of the Nevada legislation in that regard. I also suggest that federal agencies defer private land reclamation to the states when those states have reclamation requirements that meet the minimal federal standards. The regulation of the Clean Air Act is an appropriate example.

Finally, I want to make an argument for Agency discretion on mining on public lands. Agencies should be allowed to simply say no to mining when other public values outweigh mining as a use of the land. Some sites simply cannot be reclaimed and the only way to address the problem is to allow the agencies discretion to prohibit mining. I became involved with mining over ten years ago because of a proposal to put a road up a small stream in what is now part of the Nevada Wilderness System. The miner is still trying to get the road up the river, and I feel strongly that the Forest Service should have been able to evaluate the relative public values. He has been kept out of the canyon only because of extensive efforts by the conservation community, and a more astute miner would have been able to put his road up the canyon long ago.

Although mineral wealth is where you find it, the same can be said for fishing, hunting, scenery and solitude. Until the federal agencies are allowed to weigh the relative values other than mining on an equal footing, those special places will be threatened. The land use planning process is critically important, and the highest and best use for each piece of land should be determined in the plans.

I would not argue with the position that most of the land should, in fact, be open to mining under reasonable reclamation requirements. Other land may be open to mining but may require complete restoration (including refilling of the pits) of the land. And other public land with high scenic, recreational, agricultural, or wildlife values should be completely protected if mining would cause those values to be lost. Even if mining is not allowed, the minerals will still be there and future generations will have the option to make other land use decisions. But fundamentally, the public good will only be realized when agencies are required to develop land use plans which consider all land use values on an equal footing.

Glenn C. Miller
581 Creighton Way
Reno, NV 89503
702-784-4108 (w)
702-786-0462 (h)

Senator **Bumpers**. Thank you, Dr. Miller.
Mr. Gregory.

STATEMENT OF MICHAEL GREGORY, CO-DIRECTOR, ARIZONA TOXICS INFORMATION PROJECT

Mr. **Gregory**. Mr. Chairman, Senator Burns, my name is Michael Gregory. I am co-director of the Arizona Toxics Information Project, which is a private non-profit organization working for improved environmental regulation of hazardous and toxic materials. And we include mining substances within that definition.

To begin with, Mr. Chairman, I would like to thank you very much for holding these hearings and for your persistence in addressing this problem, which is a very big problem in many parts of the country, but especially, in a State like Arizona, where we have no reclamation law.

Senator **Bumpers**. You have no reclamation law at all in Arizona, Mr. Gregory?

Mr. **Gregory**. No, sir. We are one of—as I understand it—one of the two states in the country that does not—three—well, Nevada, as I understand it has just passed, and Alaska. I stand corrected—three.

Arizona, of course, has a long history of hard rock mining beginning in prehistoric times and continuing up through the Spanish era, the seventeenth and eighteenth century. And then again with the boom that began after the 49ers and the gold rush era.

Many of the sites that were mined in prehistoric times by Native Americans are the same sites that were mined by the 49ers and by later mining operations. And some of the historic most productive sites in the State are, in fact, prehistoric sites originally.

This long tradition of mineral extraction has had some very serious environmental results in the State. We are, after all, a desert state, a very fragile kind of environment and any surface disturbance is going to have lasting impacts. I am particularly concerned with toxic impacts, and in summarizing my statements I will try to focus on water pollution problems, which of course is a major issue also in a desert state.

The toxic byproducts of mining come from all aspects of mining. Although, we usually focus on mine wastes, every aspect of hard rock mining can release toxic substances into the environment. The toxicity of these chemicals, of course, varies a great deal, depending on the kind of mining, the site you are at and so forth. And I have appended to my written testimony a list of some of the typical substances in mining, and their toxicities to various media like animals, plants and so forth.

Hard rock mining has been identified as the source of toxic pollutants in more than 1,000 miles of Arizona streams and rivers. Over 50 percent of the streams or the surface waters in the state that are polluted or are recognized as polluted are polluted with mine wastes.

Underground mines are particularly prone to cause this kind of problem. We often emphasize the surface problems, but an underground mine, as you know, is a honeycomb of shafts and fissures, some manmade, some natural that is basically unmappable. And once you start pouring water back into those mines when they are closed, you create an underground environment, where you have no idea, what is going to happen to the water.

It can be pushed out of that system into the ground water and into surface water through various cracks and openings that may be created, as I say, by man or maybe the natural ones. The natural fabric of fissures and fractures underneath these mines is often the source of ground water and surface water contamination. This is especially true where in situ mining has been tried and the back pressures from the hydraulic systems have forced the contaminated water out into the natural waters.

There are two priority sites for state Superfund cleanup in Arizona that are blamed on copper mining, for instance. In the Globe-Miami area of Central Arizona, three major mining companies are now accepting responsibility—although, other companies supposedly are implicated there—for a 17 mile long plume of contamination in our ground water. The plume is moving as these plumes do. The rate is not quite certain, but it is expected by the State of Arizona that within the next six to 25 years that plume is going to reach Pinal Creek, which is a major drainage in Arizona and leads into Roosevelt Lake—a major supplier of water for the city of Phoenix.

Pinal Creek is also polluted from other mining sources besides the ones that have been accepted by these major mining companies. One of the major polluters of the creek was an old cyanide in situ leaching operation which failed utterly, and the companies went bankrupt after they poisoned the cattle in several large cattle operations in the area.

In the northwestern part of the State, the Phelps-Dodge Corporation has waste dumps near the historic site of Jerome, Arizona. And those sites are responsible for the pollution of another Superfund site, which is Bitter Creek—a tributary to the wild and scenic Verde River.

The state has not yet determined whether ground water is also contaminated in the Jerome area. But down in the southeastern corner of the state where I am from, the Bisbee Mine—which is also a Phelps-Dodge operation—although it has not yet accepted responsibility for the ground water contamination, the Phelps-Dodge mine has started supplying pure drinking water, bottled water to the residents south of the mine, where wells have been contaminated. And it is assumed by the USGS by the State of Arizona and by EPA that that pollution is coming from the Phelps-Dodge waste dumps.

The monitoring has begun only recently in these areas. So it is hard to tell how long this pollution is going. And I think that is a major point. We might have to wait 50 or more years for the water to show up as contaminated, even if we are doing close monitoring. And so, when we say that we are going to look at a reclamation site for up to 10 years in a reclamation plan, that is not really covering the ground very well.

We would suggest that the monitoring go on for considerably longer than 10 years. And, in fact, any reclamation plan should be set up to stabilize these areas for 100 or more years—I suggest 200 years. That is a fairly arbitrary figure. Depending again, on the site, the kind of mining that is going on and so forth.

Abandoned sites are a major issue in Arizona. Many of the sites I am mentioning are historic, some of them are still being mined. At Bisbee, which was mentioned by Mr. Fitzpatrick, which is a historic site, they have been mining there for over 100 years. They are in the process, right now, of opening up a brand new pit mine, a new leaching operation, which will not be as big as the old pit, but will be quite a large mine. There are no plans for reclamation of that mine or any of the other mines in Arizona. I have included some photographs of the recent operations in the back of my written testimony that you have.

Federal land managers that I have talked to in the past couple of weeks in Arizona estimate that there are tens of thousands of abandoned mines on federal lands in the state. On the Tonto National Forest, on the Arizona Strip District and the St. George District in northern Arizona alone, each of those is estimated to have several thousand abandoned mines. Many of these are considered problem sites by the managers, but they are not seriously being looked at right now, because they say, they do not have the authority, or they do not have the funding or both to get into these areas.

Now, the mining industry, of course, is undergoing a boom at the present time. And that boom is hitting Arizona, as it is other places. We have had thousands of mines claimed within the past few years. On the Arizona Strip District that BLM manages in northern Arizona 45,000 to 50,000 claims have been file since 1980—most of those for uranium mines.

Now these new mines supposedly are subject to the reclamation rules that we have been hearing about, but as we have also heard, these regulations are inadequate. And I would concur with what others have said about the inadequacy of these current rules. If these rules are not corrected, we are going to find, as Mr. Miller said, that the problems we are creating now are going to be as large or greater than the problems we already have with unreclaimed mines.

For instance, current regulations do not clearly allow consideration of the cumulative and aggregate effects of group minings, or cluster mining in an area like the Arizona Strip. There is no way for a manager at the present time to clearly address that problem, although, under the National Environmental Policy Act that should be done. And many groups in Arizona are calling for BLM, in fact, to apply NEPA.

Is that my 5-minutes?

Senator BUMPERS. That red light that went on five minutes ago was your five minutes.

Mr. GREGORY. Excuse me, sir. If I may have another minute or two to close up?

Senator BUMPERS. Go ahead.

Mr. GREGORY. Let me go directly into the recommendations given these kinds of situations. I have several recommendations.

First of all, I would recommend that stricter regulation be applied to all of these sites to assure that the best pollution reduction technology and the best monitoring is done at all sites that are mined on federal lands. There should be something that we do not have now nationwide, and that is, uniform performance standards.

The managers that I have talked to on federal lands in Arizona have different definitions of what reclamation means—from one district to another in BLM, from one forest to another in the Forest Service. There is no uniform guidance about how to reclaim or how much bonding to set.

We should also say that in some cases, the situation is so serious that mining should not be allowed. Where you cannot reclaim adequately, you should not allow mining in the first place. Traditionally mining, of course, has had a privileged environment. It has not been pushed to the limit on National Environmental Policy Act requirements. We suggest that it should be. We also recommend that the patent system, which is an invitation to abuse, be ended.

The uniform permitting system should be adopted. Before a mine is permitted, all of the potential environmental impacts should be analyzed, including those cumulative and aggregate impacts that I was speaking about, and the impacts that might come from mine tailings over a period of 100 or more years after the mine closes. Reclamation should be mandatory—it should not be discretionary. And the value of the proposed mine should be clearly weighed against all the other values of the land.

There are other recommendations in my written testimony. And I will let you gentlemen look at that. I will be glad to answer any questions. Thank you.

[The prepared statement of Mr. Gregory follows:]

ARIZONA TOXICS INFORMATION PROJECT

Joni Bosh
2127 E. Osborn
Phoenix AZ 85016
(602) 956-4390

Michael Gregory
Rt. 1 Box 25A
McNeal AZ 85603
(602) 432-7340

Statement of Michael Gregory,
Co-Director, Arizona Toxics Information Project

Before the
Subcommittee on Mineral Resources Development and Production

of the
Committee on Energy and Natural Resources, United States Senate

Oversight Hearing on
Reclamation and Bonding Practices Associated with
Hard Rock Mining on Federal and State Lands

April 19, 1990

Printed on 100 % Recycled Paper

CONTENTS

I. Background

II. Water Pollution

III. Current Situation

- A. Abandoned Sites
- B. The Current Boom
- C. Inconsistent Standards

IV. Recommendations

- A. Standards and Permitting
- B. Financial Surety
- C. Funding

V. Attachments

- A. Arizona Department of Environmental Quality List of Polluted Surface Waters (excerpts)
- B. Arizona Center for Law in the Public Interest List of Additional Surface Waters Polluted by Mining (excerpts)
- C. Environmental Defense Fund Tables of Minewastes and their Toxicity (excerpts)
- D. Arizona Department of Environmental Quality Priority Sites Pursuant to State Superfund (excerpts)
- E. Aerial Views of Phelps Dodge-Bisbee Pit Mine and Leaching Operations (April 1990)

BACKGROUND

Mr. Chairman, members of the Subcommittee, I am Michael Gregory, co-director of the Arizona Toxics Information Project, a private non-profit organization working for improved environmental regulation of hazardous and toxic materials, including substances used in and produced by mining.

At the outset, Mr. Chairman, I would like to thank you for holding these hearings and for your persistence in seeking real answers to a problem that is of great concern to the public, especially in states like Arizona that have no mining reclamation law.

Arizona, like the other western states, has a long history of hardrock mineral extraction. In my part of the state, near the Mexican border, there are mining sites that predate the Spanish invasions by hundreds of years. Arizona minerals were one of the commodities carried along the prehistoric trade routes between Central and North America.

The Spaniards came into Arizona and the Southwest in the 17thC largely for the minerals, not just the legendary El Dorado gold and silver, but for the more utilitarian minerals like copper. It was not unusual for the Spanish conquerors to work the same ore bodies that the Native Americans had used, and not infrequently they worked those mines with the forced labor of those same Native Americans.

The third wave of miners, starting shortly after the California gold rush, followed suit and some of the richest Arizona operations since the '49ers have been at ancient sites.

This long tradition of mineral extraction has had significant impacts on the fragile desert environments of the Southwest and is one of the dominant formative elements (along with cowboys and Indians and wide open spaces, etc.) in the Southwestern social and psychological environments. If you live in the Southwest, you're in mining country and mining is going to be a pervasive force in your life. Unfortunately, due to the very nature of mining, that pervasiveness can become invasive, entering not only our minds and institutions, but the most private parts of our bodies, including internal organs, tissue and cells.

Toxic by-products of mining enter the environment primarily through the air and the water. From those media, they migrate out into the food chain. Although when we talk about mining and toxics we usually think of the waste end of the cycle, all phases of a typical hardrock mining operation from exploration through post-closure expose people and our environment to toxic substances. Those substances range in toxicity from very mild to extremely hazardous, depending on the kind of ore and the mine's physical situation. (A list some of the substances likely to be found in a typical hardrock wastedump and some estimates of their toxicity to various plant and animal species are found in Attachment C).

WATER POLLUTION

Hardrock mining has been identified as the source of toxic pollutants in more than a thousand miles of Arizona streams and rivers; 50-75% of all the polluted surface waters in the state are polluted with minewastes (see Attachments A and B).

Underground mines are particularly prone to become sources of water pollution due to their complex network of shafts, stopes and fissures. There are no reliable models for hydrogeologic behavior in these honeycombed subsurface areas but when mining stops and the pumps are turned off, the subterranean chambers fill up with water and may create backpressures that force contaminants through the matrix into groundwater or springs. Contamination of aquifers from such "mine waters" is particularly likely in mines where the natural fabric of fissures and fractures has been interrupted by artificial fractures opened by blasting or by hydraulic pressures applied during in situ leaching.

Two priority sites for State Superfund cleanup are blamed on copper mining. In the Globe-Miami area of central Arizona, three major mining companies have accepted responsibility for a 17-mile long plume of contaminated groundwater. The plume is moving, and the state predicts it may reach Pinal Creek, the major drainage, in 6-25 years (Attachment D). Pinal Creek drains into Roosevelt Lake, a major source of water for Phoenix. Ten miles of Pinal Creek are already contaminated with copper, mercury, manganese and phenols from another mining operation.

In the northwestern part of the state, Phelps Dodge Corp. wastedumps near Jerome, Arizona, are responsible for another State Superfund priority: Bitter Creek, a tributary to the wild and scenic Verde River. The state has not yet determined if groundwater is also contaminated from the Jerome operations, but in the southeastern corner of the state, Phelps Dodge, while not officially named as a responsible party, has been supplying free bottled water to residents whose wells are contaminated with sulfates downgradient from its tailings ponds. The Bisbee mine is also named by the state and EPA as the source of heavy metal and acid pollution in ten miles of Mule Creek (Attachments A and B).

Since monitoring only began recently, no one knows how long the Globe-Miami and Bisbee aquifers have been contaminated, but groundwater pollution from mines may take 50 years or more to show up even with careful monitoring. The waste tailings ponds at several major mines in Arizona, like the PD sites in Jerome and Bisbee, date back to the late nineteenth century, and none of existing sites has any controls to prevent groundwater contamination. Although some, like Jerome, have been inactive for several years, others, like Bisbee are still being used. Still others are targeted to receive many more millions of tons of wastes as operators begin using new techniques to leach old wastes or, again like PD-Bisbee, open up reserves that were uneconomical with older methods. There are no reclamation plans for any of the above-named sites.

Some water pollution problems in Arizona have sources out of state. Over 280 miles of the Rio Puerco, for instance, and 265 miles of its tributaries are contaminated with arsenic, selenium, heavy metals and Radium-226 from spills out of tailing ponds at uranium mines near Gallup, New Mexico. Similarly, some 70-80 miles of the San Pedro River (including the lower 40 that pass through the Bureau of Land Management's showpiece San Pedro Riparian National Conservation Area) are periodically poisoned by tailings spills at Bisbee's sister copper mine at Cananea, 35 miles south of the border in Sonora, Mexico.

ABANDONED SITES

Responsible parties are fairly easy to identify for these sites I have mentioned, so reclamation and cleanup are theoretically possible. Other sites are not so lucky. The Harshaw Mining District near Patagonia, Arizona, for instance, is one of those historic areas where miners in the 1880s reopened old Spanish diggings. Between the 1930s and 1970s, the Harshaw District produced over $40 million worth of base and precious metals, primarily zinc, silver and lead.

Today, eleven miles of Harshaw Creek and 15 miles of Sonoita Creek downstream from their confluence are polluted with acidity, copper, magnesium and other toxic metals. Because there are so many mines in the drainage, the state has not been able to pinpoint a particular mine as the source. Many of the waste piles are at abandoned sites and responsible parties will never be found for most of these. If the problem is ever going to be cleaned up, it will have to be by the state and federal governments.

Even if the state had enough resources, it is unlikely they would be allocated to Harshaw Creek in the foreseeable future. Compared with the magnitude of problems at other sites, Harshaw is a pretty low priority. But the Harshaw District is typical of a major aspect of the mining reclamation problem in Arizona and the West. There are thousands, maybe tens of thousands, of old mines on public lands in Arizona where no responsible party can be found.

Federal land managers estimate that the Tonto and Coronado National Forests and BLM's Kingman and Safford District each has thousands of abandoned mines many of which are, for one reason or another, "problem sites." Almost all of them are hardrock sites (though some (abandoned asbestos piles on the Tonto, for instance) present other kinds of hazards.

At unreclaimed sites throughout the state, abandoned tramp metal, trash, wastedumps and inactive mineshafts present physical as well as toxic (and aesthetic) hazards. Several people each year in Arizona are killed or seriously injured from falling into unprotected mineshafts, often in remote areas where search and rescue are difficult. Regulators worry that as Arizona's population continues to explode, more and more people will fall victim to these unreclaimed hazards.

Exactly how many abandoned sites there are is unknown. Every year, pursuant to the state's Abandoned Mine Saftey Act, the State Mine Inspector's office, with part-time seasonal crew of student interns, locates about 200 more mineshafts and, constrained by budget, manage to seal far fewer than that. They do not expect to complete their inventory in our lifetimes.

THE CURRENT BOOM

Although mining has been going on a long time in Arizona, it is far from slowing down. In the past 20-30 years, the number of mines has grown extraordinarily and, despite the widespread use of "kinder and gentler" practices, the sheer scale of the current boom gives the industry a potential for environmental impacts far greater than those caused by past booms.

From 1980-1989, 45-50,000 new claims were filed on BLM's Arizona Strip District (in northern Arizona above the Colorado River and near Grand Canyon National Park). Most of them were for uranium mines. If the sites are ever developed, they presumably will have to comply with BLM's current rules for reclamation. But there are several weaknesses in the BLM rules, not least of which is the failure to require a look at the potential for cumulative and aggregate impacts on the environment of so many mines clustered in one area. The potential adverse impact is so apparent that several citizens groups have called for a moratorium on any future siting or development until BLM has complied with the National Environmental Policy Act by conducting an analysis of cumulative and aggregate impacts.

INCONSISTENT STANDARDS

Although the current Forest Service and BLM regulations address reclamation (and, consequently, are, at least in theory, a great improvement over what we had ten or more years ago), the regulations contain no uniform design or performance standards. Quality control is left to the discretion of local managers, many of whom have little or no training in the art and science of reclamation. With no uniform standards, there is no continuity from one manager to the next and no reasonable assurance that requirements will in fact protect human and environmental health.

Under the current situation, what one BLM manager calls "reclamation" another, on a contiguous district, calls overly-strict "rehabilitation"; on the first district, prevention of "undue and unnecessary degradation" requires far less strenuous measures than those required by his fellow manager next door.

On Forest Service lands, reclamation is equally discretionary, based on the requirement to return sites "where practicable, reclaim the surface. . .by taking such measures as will prevent or control on-site and off-site damage. . .including. . .isolation, removal or control of toxic materials" (36 CFR 228.8) In practice, the definition of "practicable measures" varies widely among individual managers, ranging from simple backfilling, bulldozing and contouring to attempts to achieve something like a return to "near natural" conditions. There is no agreement among Forest Service personnel, and even less between Forest Service definiitions and BLM's "undue and unnecessary degradation." This lack of consistency presents problems for miners, regulators, the public and the environment.

RECOMMENDATIONS

Standards and Permitting

In light of the foregoing, we offer the following comments and recommendations.

1. Mining will probably never be what we would call a clean industry. Almost by definition, it is bound to cause environmental insults across a whole range of indicator values from aesthetic unpleasantries to toxic assault. But its effects can be mitigated and will be if operators are given sufficient incentives. We strongly recommend strict regulation to assure that the insults are minimized to the greatest extent possible through use of Best Pollution Reduction and Monitoring Technology during all phases of the mining cycle.

2. We recommend that uniform performance standards and definitions for reclamation be established for all federal agencies to follow, including stabilization measures to prevent off-site migration of toxics during the active life of the mine and for at

least two hundred years after closure.

3. In some cases, mitigation efforts are bound to be minimally effective and mining should not be allowed at all. There is simply no way, for instance, to successfully restore a large pit mine like those found around the state of Arizona. Even if you could find enough waste rock, tailings and overburden to fill it up, the backfill is likely to cause as much risk or greater risk of water pollution as the piles. And if you could get back to something like natural contours and get something like native vegetation to grow on them (not an easy proposition in arid lands), the plants may well be too contaminated for livestock or wildlife to eat (Attachment C).

Measures can be taken to lessen some impacts, and that should be done; but on the whole, the environmental impact is going to persist for decades or centuries. For sites like these, remediation will not work: prevention is called for. Under such circumstances, FLPMA and NFMA would ordinarily favor a no action alternative.

4. But traditionally, mines have held a privileged position in multiple-use allocations because the 1872 does not allow regulators to deny or terminate a mining permit. Caught in this dilemma, managers are understandably confused about how to decide what "undue and unnecessary degradation" means. Add to this the ability of miners to patent their claims, and you end up with regulators who have far less authority to protect the environment from mining than from other industries on public lands. We recommend:

(a) that the patent system, which is an invitation to abuse the land, be ended

(b) that a uniform permitting system be adopted for public lands, including frequent review of permit conditions and compliance

(c) that before a mine is permitted, its potential environmental impacts be analyzed, including the cumulative and aggregate impacts of minefields and of mines that cannot be reclaimed

(d) that reclamation be mandatory, not discretionary, except at those sites where concerns of overbearing national significance dictate otherwise

(e) that the value of the proposed mine be weighed against competing multiple-use values

(f) that regulators be given authority to deny a permit when when the applicant cannot reasonably be expected to meet strict health and safety standards or when granting it would otherwise result in unacceptable risks.

5. Some minewastes are just too toxic to leave in piles (where they are subject to erosion from wind and surface water) or to put back into the mines (where they may be leach or leak into groundwater). Wastes at such sites should not be re-interred, but should be taken off-site to a permitted facility for treatment as hazardous waste.

Financial Surety

6. Under current rules, federal regulators complain that if a bad actor walks away leaving a mess, there is often nothing the agency can do to force restitution; often the violator is bankrupt or nearly so and could not pay even if successfully prosecuted. In such cases, responsibility falls back on the agency and cleanup is usually dependent on unlikely federal budget increases.

7. It has not been uncommon for mine operators threatened with penalties to escape into bankruptcy. The Contention Mine, for instance, which is the source of cyanide in at least one Tombstone, Arizona well, has been operated by several corporations in the past several years, and although company names have changed, the same faces seem to show up as managers and directors of one after another of the successive companies.
We recommend that financial surety be required at the outset of the permitting process; bonding or some other security should be required adequate to cover costs of continual safe operation, monitoring, and any emergency response or remediation during the life, closure and post-closure phases of the facility.

8. Financial surety standards should be set at the federal level, not left to the discretion of local managers, as at present. Standards should include a prohibition against corporate officers serving at a site where a previous company with which they were associated failed to meet environmental, financial or legal standards.

Funding

9. We recommend that funding be made available from permit fees, roylaties or other such operating charges for educational programs so that federal resource managers, the regulated community and the public can talk to each other in the same language. Without such a sharing of common knowledge and terminology, as at present, it is not clear to all managers and permittees that strict compliance with existing state and federal clean water and clear air laws is required.

10. We also recommend that funding be made available for enforcement. One of the most frequent comments of managers in the agencies we have talked to is that they have little enforcement capability. As one federal official said, "if a guy screws up. . .all we can say is, 'Hey, you ought not to do that.'"

This concludes my comments. Mr. Chairman, I want to thank you for holding hearings on this important topic and for the opportunity to make these comments. I will be glad to answer questions.

ATTACHMENT A

STATE OF ARIZONA SECTION 304(1) LIST PURSUANT TO THE FEDERAL CLEAN WATER ACT FINAL STAFF REPORT

JULY 1988

(EXCERPTS)

STATE OF ARIZONA REACH WORKSHEETS
FOR SECTION 304(1) LIST

REACH NUMBER: 15080301-000

REACH LENGTH:

LOCATION DESCRIPTION: Mule Gulch
[illegible]

SOURCE DESCRIPTION	CRITERIA	SOURCE CHARACTER	TOXICS	IMPACT LENGTH
Copper Queen Phelps Dodge	⑨ 13	P(Industrial)	yes	10 miles [illegible]

PARAMETERS: pH, Pb, Zn, Cu, Cd, D.O., Mn, Se
[illegible]

OTHER REACHES IMPACTED: **LENGTH**

STATE OF ARIZONA REACH WORKSHEETS
FOR SECTION 304(l) LIST

REACH NUMBER: 15070103-007

REACH LENGTH: 25.1 miles

LOCATION DESCRIPTION: Hassayampa River

SOURCE DESCRIPTION	CRITERIA	SOURCE CHARACTER	TOXICS	IMPACT LENGTH
Senator Mine	13	P	yes	10 miles
Inactive Mining	13	P	yes	10 miles

PARAMETERS: pH, turbidity, Cd, Hg, As, Pb, Mn, Se

OTHER REACHES IMPACTED: LENGTH

STATE OF ARIZONA REACH WORKSHEETS
FOR SECTION 304(l) LIST

REACH NUMBER: 15070102-000

REACH LENGTH:

LOCATION DESCRIPTION: Galena Gulch

SOURCE DESCRIPTION	CRITERIA	SOURCE CHARACTER	TOXICS	IMPACT LENGTH
Jerome Mining	11	P	yes	10 miles
Bradshaw Redi-Mix	13	P	yes	2 miles

PARAMETERS: pH, Cu, Cr, Mn, Ba, Pb

OTHER REACHES IMPACTED: LENGTH

STATE OF ARIZONA REACH WORKSHEETS
FOR SECTION 304(1) LIST

REACH NUMBER: 15060103-005

REACH LENGTH: 17.6 miles

LOCATION DESCRIPTION: Pinal Creek/Bloody Tanks & Miami Wash

SOURCE DESCRIPTION	CRITERIA	SOURCE CHARACTER	TOXICS	IMPACT LENGTH
Industrial	4	P(Industrial)	yes	14 miles
Industrial Mining— ~~White~~ LIVE Oak, OxHide, RANCHERS, & NEW WEBSTER GULCH	4	P/NP(Industrial)	yes	10 miles

PARAMETERS: Hg, Cu, NH_3, phenols, pH, turbidity, Mn

OTHER REACHES IMPACTED: LENGTH

STATE OF ARIZONA REACH WORKSHEETS
FOR SECTION 304(1) LIST

REACH NUMBER: 15050305-007

REACH LENGTH: 4.4 miles

LOCATION DESCRIPTION: Aguirre Wash
(headwaters area)

SOURCE DESCRIPTION	CRITERIA	SOURCE CHARACTER	TOXICS	IMPACT LENGTH
Industrial	4	P(Industrial)	yes	3 miles
Silver Bell				

PARAMETERS: Cu, Cd, Se, Zn, pH

OTHER REACHES IMPACTED:	LENGTH

STATE OF ARIZONA REACH WORKSHEETS
FOR SECTION 304(l) LIST

REACH NUMBER: 15050301-013

REACH LENGTH: 30.2 miles

LOCATION DESCRIPTION: Sonoita Creek (from Red Rock Canyon to Patagonia) & Harshaw Wash (from headwaters to Sonoita Creek)

SOURCE DESCRIPTION	CRITERIA	SOURCE CHARACTER	TOXICS	IMPACT LENGTH
Sonoita Creek	4	P(Industrial)	yes	15 miles
Harshaw Wash	4	P(Industrial)	yes	11 miles

PARAMETERS: Cu, Mg & other metals, pH

OTHER REACHES IMPACTED:	LENGTH
15050301-000	11 miles

STATE OF ARIZONA REACH WORKSHEETS
FOR SECTION 304(l) LIST

REACH NUMBER: 15050301-000

REACH LENGTH: 5 miles

LOCATION DESCRIPTION: Tinaja Wash (headwaters to Esperanza Wash)

SOURCE DESCRIPTION	CRITERIA	SOURCE CHARACTER	TOXICS	IMPACT LENGTH
Industrial Mine seepage	4	NP	yes	5 miles

PARAMETERS: pH, Cu & other metals

OTHER REACHES IMPACTED:	LENGTH

STATE OF ARIZONA REACH WORKSHEETS
FOR SECTION 304(1) LIST

REACH NUMBER: 15050202-008

REACH LENGTH: 27.3 miles

LOCATION DESCRIPTION: San Pedro River
(Mexico border to Gila Confluence)

SOURCE DESCRIPTION	CRITERIA	SOURCE CHARACTER	TOXICS	IMPACT LENGTH
Other	4	P/Unknown	yes	136 miles

PARAMETERS: D.O., NO_3, FC, Se, Hg, Mn, Cu, B, pH, turbidity

OTHER REACHES IMPACTED:	LENGTH
15050202-006	7.4 miles
15050202-005	.5 miles
15050202-003	14.9 miles
15050202-002	13.2 miles
15050202-001	6.2 miles
15050203-012	13.5 miles
15050203-011	13.2 miles
15050203-009	4.6 miles
15050203-008	11.8 miles
15050203-003	18.4 miles
15050203-001	11.1 miles

STATE OF ARIZONA REACH WORKSHEETS
FOR SECTION 304(1) LIST

REACH NUMBER: 15050100-010

REACH LENGTH: 16.4 miles

LOCATION DESCRIPTION: Gila River
(from Coolidge Dam to San Pedro River)

SOURCE DESCRIPTION	CRITERIA	SOURCE CHARACTER	TOXICS	IMPACT LENGTH
Industrial Mining	4* [illegible]	P(Industrial)	yes	27 miles
Unknown	4	NP	yes	27 miles
Unknown	4	Unknown	yes	27 miles

PARAMETERS: Hg, Cu, Bacteria

OTHER REACHES IMPACTED:	LENGTH
15050100-009	10.6 miles

* 1988 Investigation shows no current discharges. All mines operating with lagoons.

STATE OF ARIZONA REACH WORKSHEETS FOR SECTION 304(1) LIST

REACH NUMBER: 15050100-008

REACH LENGTH: 10.6 miles

LOCATION DESCRIPTION: Gila River
(San Pedro River to Mineral Creek)

SOURCE DESCRIPTION	CRITERIA	SOURCE CHARACTER	TOXICS	IMPACT LENGTH
Industrial Mines (Arsco)	4*	P(Industrial)	yes	24.9 miles
Unknown	4	NP	yes	24.9 miles
Unknown	4	Unknown	yes	24.9 miles

PARAMETERS: D.O., turbidity, Hg, Cu, Fc

OTHER REACHES IMPACTED:	LENGTH
15050100-007	14.3 miles

---

* 1988 Investigation shows no current discharges. All mines operating with lagoons.

STATE OF ARIZONA REACH WORKSHEETS
FOR SECTION 304(1) LIST

REACH NUMBER: 15040004-001

REACH LENGTH: 10.7 miles

LOCATION DESCRIPTION: San Francisco River
(from Chase Creek to below Clifton)

SOURCE DESCRIPTION	CRITERIA	SOURCE CHARACTER	TOXICS	IMPACT LENGTH
Mining	4	P	Yes	3 miles

PARAMETERS: Cu, Mg, Zn, As, Se, Hg, pH, turbidity

OTHER REACHES IMPACTED: LENGTH

revised

STATE OF ARIZONA REACH WORKSHEETS
FOR SECTION 304(l) LIST

REACH NUMBER: 15040002-013

REACH LENGTH: 12.9 miles

LOCATION DESCRIPTION: Bitter Creek

SOURCE DESCRIPTION	CRITERIA	SOURCE CHARACTER	TOXICS	IMPACT LENGTH
Phelps Dodge	13	P	yes	12 miles

PARAMETERS: pH, Cu, Mn, & other metals

OTHER REACHES IMPACTED:	LENGTH
15040002-003	2.2 miles

STATE OF ARIZONA REACH WORKSHEETS
FOR SECTION 304(l) LIST

REACH NUMBER: 15030202-006

REACH LENGTH: 25.5 miles

LOCATION DESCRIPTION: Boulder Creek (from confluence of Wilder Creek to Burro Creek)

SOURCE DESCRIPTION	CRITERIA	SOURCE CHARACTER	TOXICS	IMPACT LENGTH
Industrial Bagdad	4	P(Industrial)	yes	10 miles
Hillside	4 -13	P(Inactive Mining)	yes	10 miles

PARAMETERS: Cu, Zn, pH

OTHER REACHES IMPACTED:	LENGTH
15030202-005	7.6 miles

STATE OF ARIZONA REACH WORKSHEETS
FOR SECTION 304(l) LIST

REACH NUMBER: 15020016-008

REACH LENGTH: 7.1 miles

LOCATION DESCRIPTION: Little Colorado River
(mined area to below Cameron)

SOURCE DESCRIPTION	CRITERIA	SOURCE CHARACTER	TOXICS	IMPACT LENGTH
Mining area	4	P(Industrial)	yes	30 miles

PARAMETERS: Pb, Hg, B, turbidity, gross alpha

OTHER REACHES IMPACTED:	LENGTH
15020016-004	.9 miles
15020016-003	22.5 miles
15020016-001	12.7 miles

STATE OF ARIZONA REACH WORKSHEETS
FOR SECTION 304(l) LIST

REACH NUMBER: 15020008-020

REACH LENGTH: 5.5 miles

LOCATION DESCRIPTION: Little Colorado River (from Rio Puerco to confluence with the Colorado River)

SOURCE DESCRIPTION	CRITERIA	SOURCE CHARACTER	TOXICS	IMPACT LENGTH
Industrial mining	4 ... 3	P(Industrial)NP	yes	194 miles
Holbrook WWTP	11	P(Municipal)	yes	10 miles

PARAMETERS: As, Cu, Mn, Pb, Ra-226, Se, NH3, Phenol, Sulfide

OTHER REACHES IMPACTED:	LENGTH
15020008-019	.6 miles
15020008-017	18.7 miles
15020008-015	4.6 miles
15020008-014	7.0 miles
15020008-013	1.6 miles
15020008-005	1.2 miles
15020008-003	36.1 miles
15020008-002	3.5 miles
15020008-001	20.2 miles
15020016-013	6.6 miles
15020016-012	8.3 miles
15020016-010	20.2 miles
15020016-008	7.1 miles
15020016-004	.9 miles
15020016-003	22.5 miles
15020016-001	29.9 miles

revised

STATE OF ARIZONA REACH WORKSHEETS
FOR SECTION 304(1) LIST

REACH NUMBER: 15020008-020

REACH LENGTH: 5.5 miles

LOCATION DESCRIPTION: Little Colorado River

SOURCE DESCRIPTION	CRITERIA	SOURCE CHARACTER	TOXICS	IMPACT LENGTH
Holbrook WWTP	11	P(Municipal)	yes	10 miles
Mining area	4	P(Industrial)	yes	10 miles

PARAMETERS: NH_3, phenol, sulfide

OTHER REACHES IMPACTED:	LENGTH
15020008-019	.6 miles
15020008-017	18.7 miles

STATE OF ARIZONA REACH WORKSHEETS FOR SECTION 304(1) LIST

REACH NUMBER: 15020006-003

REACH LENGTH: 14.0 miles

LOCATION DESCRIPTION: Puerco River
(New Mexico border to Holbrook)

SOURCE DESCRIPTION	CRITERIA	SOURCE CHARACTER	TOXICS	IMPACT LENGTH
Industrial Uranium Mines (N.M.)	4	P(Industrial)	yes	280 miles

PARAMETERS: As, Cu, Mn, Pb, Ra-226, Se

OTHER REACHES IMPACTED:	LENGTH
15020006-001	6.2 miles
15020007-012	14.6 miles
15020007-011	6.2 miles
15020007-009	6.8 miles
15020007-008	18.2 miles
15020007-007	.3 miles
15020007-005	6.6 miles
15020007-003	3.1 miles
15020007-002	1.5 miles
15020007-001	13.4 miles
15020008-019	.6 miles
15020008-017	18.7 miles
15020008-015	4.6 miles
15020008-014	7.0 miles
15020008-013	1.6 miles
15020008-005	1.2 miles
15020008-003	36.1 miles
15020008-002	3.5 miles
15020008-001	20.2 miles
15020016-013	6.6 miles
15020016-012	8.3 miles
15020016-010	20.2 miles
15020016-008	7.1 miles
15020016-004	.9 miles
15020016-003	22.5 miles
15020016-001	29.9 miles

ATTACHMENT B

ARIZONA CENTER FOR LAW IN THE PUBLIC INTEREST

PETITION TO EPA TO ADD WATERS AND POINT SOURCES TO LISTS
UNDER SECTIOIN 304(1) OF THE CLEAN WATER ACT - ARIZONA

28 DECEMBER 1989

(EXCERPTS)

TABLE 1

Reach No.	Reach Name	Segment	Toxics	Source*	Documentation**
15080301-008	Whitewater Draw	Mule Gulch	Pb, Zn, Cu, Cd, Mn	Mining & Land Disposal^1	WQA at 70, App. C at 10, App. D at 1; NSA at 99
15070103-007	Hassayampa River		Metals	Mining^2	WQA, App. D at 1; NSA at 72
15070103	Monarch Wash		Cd, Hg, As, Pb, Mn, Se	Mining	WQA at 42-43, App. C at 4; NSA at 70
15070102-034	Big Bug Creek		Metals	Mining	WQA, App. D at 1; NSA at 69
15070102-033	Lynx Creek		Metals, Cu, Zn	Mining	WQA, App. C at 4, App. D at 4; NSA at 70
15050100-009	Gila	Dripping Springs to San Pedro	Metals, Cu, Hg	P(In)	WQA, App. D at 2; NSA at 68
15050100-008	Gila	at San Pedro	Metals	Mining(M)	WQA, App. D at 2; NSA at 68
15040004-001	San Francisco		Metals, Zn, Hg	Mining	WQA, App. C at 8, App. D at 3; NSA at 123
15060202	Bitter Creek		Cu, Zn, Cd	Mining^3	WQA, App. D at 1; NSA at 134, 141
15040002-004	Gila		Metals	Mining(M)	WQA, App. D at 3; NSA at 122

---

* 'P(In)' means an industrial point source. An '(M)' in this column means that there may be additional sources of the toxics problem.

** References are as follows: WQA - State of Arizona, Water Quality Assessment for 1988 [§305(b) report June 30, 1989 ("App." references are to appendices to the WQA); NSA - Arizona Department of Environmental Quality 1988 Draft Nonpoint Source Assessment Report (Oct. 18, 1988).

Reach No.	Reach Name	Segment	Toxics	Source	Documentation
15040002-003	Gila		Metals	Mining(M)	WQA, App. D at 3; NSA at 122
15040002-002	Gila		Metals	Mining(M)	WQA, App. D at 3; NSA at 122
15040002-001	Gila		Metals	Mining(M)	WQA, App. D at 3; NSA at 122
15060103	Pinal Creek	Near Globe	Mn, Cu, Metals	Mining[4]	WQA at 48, App. C at 8, App. D at 2; NSA at 85, 91
15050305-007	Aguirre Wash		Metals	Mining[5]	WQA App. D at 2, NSA at 108, 115
15050301-013	Sonoita Creek		Pb, Cr, Cd, As, Mn, Cu, Zn	Mining	WQA App. D at 2; NSA at 106, 115
15050301	Harshaw Creek		Metals	Mining	WQA App. D at 2; NSA at 106, 115
15050301	Tinaja Wash		Metals	Mining	WQA App. D at 2; NSA at 106, 115
15050203-003	San Pedro	Peppersauce to Camp Grant	Hg, Cu	Mining(M)	WQA App. D at 2; NSA at 99
15050202-002	San Pedro (below St. David)	Dragoon W - Tres Alomos W.	Cu	Mining(M)	WQA App. C at 7, App. D at 2; NSA at 98
15050202-003	San Pedro (above St. David)	Babcomari Dragoon W	Pb, Mn, Cu Hg, Se	Land Disposal Mining	WQA App. C at 7, App. D at 2; NSA at 97
15050202-006	San Pedro	Charleston	Hg	Mining(M)	WQA App. D at 2; NSA at 97
15050202-008	San Pedro		Pb, Cu	Mining(M)	WQA App. D at 2; NSA at 97
15050100-005	Middle Gila		Metals, Phenols	Mining(M)	WQA App. D at 2; NSA at 68
15040005-024	Upper Gila	S.F. Confluence	Metals	Mining(M)	WQA App. D at 2; NSA at 119, 123

Reach No.	Reach Name	Segment	Toxics	Source	Documentation
15040005-023	Upper Gila		Metals	Mining(M)	WQA App. D at 2; NSA at 119, 123
15040005-022	Upper Gila		Metals	Mining(M)	WQA App. D at 2; NSA at 119, 124
15040005-020	Upper Gila		Metals, Cu	Mining(M)	WQA App. D at 2; NSA at 119, 124
15040005-019	Upper Gila		Metals	Mining(M)	WQA App. D at 2; NSA at 119, 124
15040005-017	Upper Gila		Metals, Cu, B	Mining(M)	WQA App. C at 8, App. D at 2; NSA at 119, 124
15040005-016	Upper Gila		Metals	Mining(M)	WQA App. D at 2; NSA at 119, 124
15040005-015	Upper Gila		Metals	Mining(M)	WQA App. D at 2; NSA at 119, 124
15040005-014	Upper Gila		Metals	Mining(M)	WQA App. D at 2; NSA at 119, 124
15040005-012	Upper Gila		Metals	Mining(M)	WQA App. D at 2; NSA at 119, 124
15040005-011	Gila	Calva	Metals, Cu, Hg, Pb, Zn	Mining(M)	WQA App. D at 2; NSA at 119, 125
15040005-010	Gila	near Bylas	Metals	Mining(M)	WQA App. D at 2; NSA at 119, 125
15040002-002	Gila		Metals	Mining(M)	WQA App. D at 3; NSA at 119, 122

Reach No.	Reach Name	Segment	Toxics	Source	Documentation
15030202-005, -006	Boulder Creek		Metals	Mining[6]	WQA App. D at 3; NSA at 32
15030107-003	Colorado River	below Imperial Dam	Toxics	Municipal[7] POTW	WQA App. D at 3; NSA at 34
15020016-001	Little Colorado		Metals (Radioactivity)	Mining	WQA at 38, App. D at 3; NSA at 60, 64
15020016-003	Little Colorado		Metals (Radioactivity)	Mining	WQA at 38, App. D at 3; NSA at 60, 64
15020016-004	Little Colorado		Metals (Radioactivity)	Mining	WQA at 38, App. D at 3; NSA at 59, 64
15020016-008	Little Colorado	at Cameron	Metals, Mu, Hg, Pb, Radioactivity	Mining	WQA at 38, App. D at 3; NSA at 59, 64
15020016-010	Little Colorado		Metals (Radioactive) Cu, Pb, Zn, Hg	Mining	WQA at 38, App. D at 3; NSA at 58, 64
15020016-012	Little Colorado		Metals	Mining	WQA at 38, App. D at 3; NSA at 58, 64
15020007-001	Puerco	near Holbrook	As, Cu, Hg, Pb, Metals (upstream sources)	Mining	WQA at 38, App. D at 3; NSA at 42, 53
15020007-002	Puerco		Metals	Mining	WQA at 38, App. D at 3; NSA at 42, 53
15020007-003	Puerco		Metals	Mining	WQA at 38, App. D at 3; NSA at 42, 52

Reach No.	Reach Name	Segment	Toxics	Source	Documentation
15020007-005	Puerco	above Petrified Forest	Metals, As, Cu, Mn, Pb, Radioactive	Mining	WQA at 38, App. D at 3; NSA at 42, 52
15020007-007	Puerco		Metals	Mining	WQA at 38, App. D at 3; NSA at 42, 52
15020007-008	Puerco		Metals	Mining	WQA at 38, App. D at 3; NSA at 42, 52
15020007-009	Puerco		Metals	Mining	WQA at 38, App. D at 3; NSA at 42, 52
15020007-011	Puerco		Radioactive, Hg, Metals (upstream sources)	Mining	WQA at 38, App. D at 3; NSA at 42, 52
15020007-012	Puerco		Metals, As, Cu, Mn, Pb, Se, Radiation	Mining	WQA at 38, App. D at 3; NSA at 42, 52
15020006-003	Puerco		Metals, As, Mu, R-226, Pb, Cu	Mining	WQA at 38, App. C at 1, App. D at 3; NSA at 42, 51
15020006-001	Puerco		Metals, As, Mn, Pb	Mining	WQA at 38, App. C at 1, App. D at 3; NSA at 42, 51
	Copper Creek	at Bagdad Mine discharge	Zn, Cu, Cd	Mining (DEQ has identified Cyprus Bagdad Copper Co. as a source)	WQA at 32-34
	Poland Tunnel	trib. to Black Canyon Creek	Cd	Mine runoff	WQA at 43
	Cave Creek		Hg	Mine discharge	WQA at 43
	Agua Fria	at Rock Springs	Hg	Mining	WQA at 43.
	Agua Fria	near Dewey	Cr, Cu, Pb, Mn, Ba	Mining	WQA at 43

TABLE I FOOTNOTES

[1] DEQ initially identified Phelps Dodge as a discharger on this segment, but asserted it was a nonpoint source. Exhs. 5 & 6.

[2] DEQ initially identified the Senator Mine as a discharger on this segment, but asserted it was a nonpoint source. Exhs. 5 & 6.

[3] DEQ initially identified Phelps Dodge as a discharger on this segment, but asserted it was a nonpoint source. Exhs. 5 & 6.

[4] A DEQ memorandum cites Cyprus Miami Mining Co. in connection with this stretch, but does not explain why the water or sources were not listed. Exh. 5. The memo does state that Cyprus Miami "has permitted all point source discharges" but does not address whether more stringent permit conditions would help to alleviate toxics problems in the creek. Id.

[5] DEQ has identified the Silver Bell Mine as a source of the metals pollution. NSA at 115.

[6] DEQ initially identified Hillside Mine as a discharger on this stretch, but ultimately found the toxics problem to be nonpoint source in origin. Exhs. 5 & 6.

[7] According to DEQ the Yuma POTW failed a whole effluent toxicity test, but was not listed because priority pollutants were not found. Exh. 5 at 5; WQA at 73. We believe that any violation of the state's narrative toxicity standard requires listing.

ATTACHMENT C

COMMENTS OF THE ENVIRONMENTAL DEFENSE FUND CONCERNING THE EAGLE MINE FEASIBILITY STUDY, DETAILED ANALYSIS REPORT, AND REMEDIAL INVESTIGATION

JANUARY 10, 1986

(EXCERPTS)

TABLE C-1. ELEMENTS PRESENT IN TAILINGS FROM ACID-LEACH MILLS AND IN TYPICAL SOIL[a]

Element	"Typical"[b] Soil	Salt Lake City, Utah	Shiprock New Mexico	Durango Colorado	Lakeview Oregon	Other Piles
		Concentration of Element (ppm)				
Uranium	1.0	58-271	25-56	170-477	22	
Molybdenum	2.0	330-550	-	-	260	
Selenium	0.2	5.9-69	23-233	<0.7-28.6	40	
Vanadium	100	158-3040	709-4440	1540-4110	-	1850-2350
Arsenic	6	73-419	21-200	44-632	2030	
Chlorine	100	55-6820	27-122	521-2700	-	
Antimony	2-10	8.6-160	1.2-67	<0.5-10.1	-	
Calcium	14000	25000-82000	9000-87000	7000-57000	-	
Cerium	50	44-159	18-76	77-279	-	
Bromine	5	<1.4-6.3	<1.7	<5.0	-	
Sodium	6000	4000-10000	1000-2000	7000-47000	-	
Iron	38000	8000-316000	1200-11000	10000-41000	-	
Terbium	0.6	<0.2-1.3	<0.1-5.4	<0.2-2.3	-	
Cobalt	8	5.5-42	0.8-4.9	9.2-138	-	
Aluminum	71000	20000-67000	11000-43000	14000-72000	-	
Barium	500	194-3860	726-1240	869-4080	-	
Europium	0.5	0.35-1.33	0.33-1.27	0.36-2.13	-	
Gallium	30	<19-76	<19	<27-123	-	
Lanthanum	30	10.9-35.7	4.6-27.6	8.1-43.8	-	
Manganese	850	79-2080	21-114	91-1280	100-10000	
Scandium	7	3.0-9.5	1.1-6.9	1.8-8.4	-	
Zinc	50	<24-350	<17-175	155-2270	32	
Chromium	100	22-7250	18-54	12-3250	16	
Potassium	14000	<5000-25000	6000-19000	<1000-8000	-	
Thorium	5	4.5-33.1	1.2-7.0	1.9-9.6	-	
Titanium	5000	1420-5660	471-3130	<533-3160	-	
Ytterbium	2	<1.1-6.3	<0.5-4.2	<0.8-5.8	-	
Cesium	6	4.5-15.1	0.9-4.1	1.3-4.4	-	
Hafnium	6	2.9-7.0	3.5-8.0	4.1-8.7	-	
Magnesium	5000	<2000-14000	<1000-17000	<2000-10000	-	
Rubidium	100	46-560	18-79	39	-	
Tantalum	0.8	<0.6-1.9	<1.0	<0.5-2.6	-	
Strontium	300	<198-4130	<71-4.8	127-575	-	
Tungsten	1	4.6-570	<.05-7.6	<.05-8.7	-	
Mercury	.03	<0.01-0.13	<0.03	<0.01-0.30	34	
Lead	10	350-3100	-	-	104	812
Copper	20	310-1080	-	-	-	1160
Tin	-	60-6200	-	-	-	-
Nickel	40	550-1070	-	-	-	550-1070

(a) (Dr78, Dr81a, and FB76-78). (b) (Bo66). (-) No data.

TABLE C-2. SELECTED ELEMENTS MEASURED IN SOILS AND ROCK

Element	Symbol	Concentration in Soil (parts per million) Background[(a)]	"Typical"[(b)]	Concentration in Rock (Parts per million) Sedimentary[(c)]	Sandstone[(d)]	Limestone[(d)]	Shale[(d)]
Aluminum	Al	3730	71000	--	25000	4200	80000
Antimony	Sb	0.48	2-10	0.0n	0.05	0.2	1.5
Arsenic	As	4.4	6	1	1	1	13
Barium	Ba	351	500	n0.0	50	120	580
Boron	B	--	--	--	35	20	100
Cadmium	Cd	--	0.06	--	0.05	0.035	0.3
Chromium	Cr	22	100	35	35	11	90
Cobalt	Co	3.7	8	0.3	0.3	0.1	19
Copper	Cu	--	20	1	5	4	45
Iron	Fe	1210	38000	28000	9800	3800	47200
Lead	Pb	--	10	7	7	9	20
Manganese	Mn	167	850	400	50	1100	850
Mercury	Hg	--	0.03	--	0.03	0.04	0.4
Molybdenum	Mo	1.9	2.0	0.2	0.2	0.4	2.6
Nickel	Ni	--	40	2	2	20	68
Radium-226	Ra	--	1.5×10^{-6}	--	7×10^{-7}	4×10^{-7}	1.1×10^{-6}
Selenium	Se	1.3	0.2	--	0.05	0.08	0.6
Silver	Ag	--	0.1	0.0n	0.05	0.05	0.07
Thorium	Th	6.2	5	--	1.7	1.7	12
Tin	Sn	--	--	0.n	0.5	0.5	6
Uranium	U	2.4	1.0	--	0.45	2.2	3.7
Vanadium	V	20	100	20	20	20	130
Zinc	Zn	29	50	16	16	20	95

(a) Concentrations measured in soil around a tailings pile by Dreesen, et al., (Dr78).

(b) Concentrations in a hypothetical "typical" soil (Bo66).

(c) (Ma81).

(d) (Cap77).

"n" represents any digit from 1 to 9.

TABLE C-4. COMPARISON OF DAILY INTAKE LEVELS OF SELECTED ELEMENTS
(in mg)

Element	Recommended Dietary Allowances(a)	Adequate and Safe Intake(a)	Typical Food Intake(a)	Potentially Toxic Intake(b)
Arsenic	-	(0.025-0.05)(c)	0.0114(d)	0.2-0.5
Chromium	-	0.05-0.20	0.062	5-200
Copper	-	2-3	1.5	80-400
Iron (men)	10			3000-20000
(women)	18		19	6000-30000
Manganese	-	2.5-5	1-6.4	300-600
Molybdenum	-	0.15-0.50	0.10	2-20
Nickel	-	(0.05)(c)	0.165-0.500	6
Selenium	-	0.05-0.20	0.15(e)	5-20
Vanadium	-	(0.025)(c)	0.02	1-3
Zinc	15	-	12	600-4000

(a) (NAS80).

(b) Estimated from Table C-3 and (NAS80).

(c) Estimated from animal studies--not a true recommended adequate and safe intake.

(d) Total dietary intake (food and water).

(e) Total dietary intake (food and water)--variable by region.

hazard to man. While Table C-4 was developed on the basis of the requirements of a healthy adult (e.g., 20-50 y), age-specific estimates can also be developed if required for site-specific analyses.

Estimates of Toxicity in Livestock

While there is little data on the chronic toxicity of micronutrient and elements in livestock via the water pathway, some estimates may be derived from published oral-toxicity data. The National Academy of Sciences (NAS72c) estimated water consumption for several species of livestock; both ruminants (beef cattle, dairy cattle, and sheep) and nonruminants (swine and poultry). The estimate was based on the quantity of dry matter in the ration, ambient temperature, and milk production (in the case of dairy cattle). Estimated water consumption, in liters per kilogram of dry matter in ration, for a temperate climate (70° F) are:

Beef Cattle (450 kg) - 5.3
Dairy Cattle (450 kg, 12.8 kg/day milk) - 39
Sheep - 1.5
Swine - 2.5
Poultry - 2.5

Water consumption estimates may have to be increased by a factor of two to three in hot weather, and those for dairy cattle increased further by a factor of two to three for higher milk production.

TABLE C-5. CONCENTRATION OF ELEMENTS IN ANIMAL RATION LEADING TO CHRONIC TOXICITY(a)

(in ppm)

Element	Beef Cattle	Dairy Cattle	Sheep	Swine	Poultry
Copper(b-e)	200-500	200-500	100-150	250-750	800-1600
Lead(f)	300	300	-	-	80
Manganese(c)	-	-	390-700	500	1000^{+}
Molybdenum(c,d)	20-100	20-100	5-20	1000	200-4000
Selenium(b,c,g)	4-8	4-8	4-10	7-15	8-15
Vanadium(c,d)	(***	young ruminants 20	***)	-	35+
Zinc(c)	900-1700	900-1700	700-1500	4000+	1200-1400

(a) Animal ration is the total feed intake, including water.
(b) (Hi77).
(c) (Un77).
(d) (Ve78).
(e) (Ro74).
(f) (NAS72a).
(g) (Fib77).

From the preceding estimates of water consumption and toxicity, when the intake in feed leading to toxic symptoms is reported, an estimate can be calculated of the concentration in water leading to a similar intake of the element. For example, concentrations in ration leading to chronic toxicity (Table C-5) have been translated, on the basis of water consumption only, to the potentially toxic water concentrations in Table C-6.

Almost all micronutrients and elements seem to interact with one another in some way, but specific recommendations are difficult to make because of incomplete data on all elements in food and water (Sa80). Therefore, it would seem prudent to limit the levels of toxic elements in water given to livestock. Reasonable levels to recommend for continuous consumption of water might be one tenth of the lowest level expected to lead to chronic toxicity, as calculated in Table C-6. These levels are shown in Table C-7.

TABLE C-6. CONCENTRATIONS OF ELEMENTS IN WATER POTENTIALLY TOXIC TO LIVESTOCK
(in ppm)

Element	Beef Cattle	Dairy Cattle	Sheep	Swine	Poultry
Copper	37.8-94.3	5-13	67-100	100-300	533-1067
Lead	56.6	7.7	-	-	53
Manganese	-	-	260-467	200	667+
Molybdenum	3.8-18.9	0.51-2.6	3.3-13.3	400	133-2667
Selenium	0.75-1.5	0.10-0.20	2.7-6.7	2.8-6	5.3-10
Vanadium	3.8	0.51	13.3	-	23+
Zinc	170-321	23-44	467-1000	1600+	800-933

TABLE C-7. RECOMMENDED MAXIMUM CONCENTRATIONS OF ELEMENTS IN WATER FOR LIVESTOCK
(in ppm)

Element	Estimates based on Table C-6		NAS Recommendations for Livestock (NAS72c)
Aluminum	-	-	5
Arsenic	-	-	0.2
Boron	-	-	5
Cadmium	-	-	.05
Chromium	-	-	1
Cobalt	-	-	1
Copper	40	(0.5 for dairy cattle)	0.5
Fluoride	-	-	2
Lead	5	(0.5 for dairy cattle)	0.1
Manganese	20	-	-
Mercury	-	-	.01
Molybdenum	0.3	(0.05 for dairy cattle)	-
Nitrate-N	-	-	100
Selenium	0.1	(0.01 for dairy cattle)	0.05
Vanadium	0.4	(0.05 for dairy cattle)	0.1
Zinc	20	(2 for dairy cattle)	25

TABLE C-8. MAXIMUM CONCENTRATION OF ELEMENTS IN IRRIGATION WATER NOT IMMEDIATELY TOXIC TO CROPS (NAS72c)
(in ppm)

Element	Water used continuously on all soils (calculated on the basis of 100 years)	Water used up to 20 years on fine textured soils of pH 6.0 to 8.5
Aluminum(a)	5.0	20.0
Arsenic	0.10	2.0
Beryllium	0.10	0.5
Boron	0.75	2.0
Cadmium	0.01	0.05
Chromium	0.10	1.0
Cobalt	0.05	5.0
Copper	0.20	5.0
Fluoride	1.0	15.0
Iron	5.0	20.0
Lead	5.0	10.0
Lithium	2.5(b)	2.5(b)
Manganese	0.20	10.0
Molybdenum	0.010(c)	0.05(c,d)
Nickel	0.20	2.0
Selenium	0.02(c)	0.02(c)
Vanadium	0.10	1.0
Zinc	2.0	10.0

(a) Soil conditioned with $CaCO_3$ when necessary.
(b) 75 ug/l for citrus crops.
(c) Rased on potential toxicity in animals.
(d) Relatively high iron oxide content in soil.

TABLE C-11. ESTIMATED CONCENTRATION OF ELEMENTS IN SOIL THAT WILL PRODUCE A CONCENTRATION OF 1 ppm IN CROPS

Element	Transfer Factor ($\times 10^{-3}$)			Soil Concentration (ppm) Yielding 1 ppm in Air Dried Crop	
	b_v	b_r	b_e[(a)]	Food[(b)] S_h	Forage[(c)] S_a
Arsenic	40	6.0	15	67	25
Barium	150	15	49	20	6.7
Boron	4000	2000	2500	0.40	0.25
Cadmium	550	150	250	4.0	1.8
Chromium	7.5	4.5	5.3	190	130
Copper	400	250	290	3.4	2.5
Iron	4.0	1.0	1.8	560	250
Lead	45	9.0	18	56	22
Manganese	250	50	100	10	4.0
Mercury	900	200	380	2.6	1.1
Molybdenum	250	60	110	9.1	4.0
Nickel	60	60	60	17	17
Selenium	25	25	25	40	40
Silver	400	100	180	5.6	2.5
Tin	30	6.0	12	83	33
Vanadium	5.5	3.0	3.6	280	180
Zinc	1500	900	1100	0.91	0.67

(a) $b_e = 0.255\, b_v + 0.745\, b_r$.

b_v = vegetative portions of plants

b_r = reproductive and storage portions of plants

(b) Crops used in human diet:

S_h = soil concentration (ppm) that yields 1 ppm in crops consumed by humans.

(c) Crops used to feed livestock:

S_a = soil concentration (ppm) that yields 1 ppm in crops consumed by animals.

TABLE C-12. SOIL CONCENTRATIONS OF ELEMENTS THAT MIGHT BE ASSOCIATED WITH TOXIC CONCENTRATIONS IN THE FOOD PATHWAY

Element		Soil Concentration Yielding 1 ppm (1 ug/g) Wet Wt.[a]	Concentrations[b] (ppm) in Ration Toxic to Livestock		Human[c] Adequate & Safe Intake (ug/d)	Soil[d] Concentration for Potentially	
			Ruminants	Nonruminants		Safe Human Intake (ppm)	Toxic Human Intake (ppm)
Arsenic	S_h	268	-	-	50	26.8	322 to 1610
	S_a	100	-	-	-	-	-
Boron	S_h	2.5	-	-	-	-	5000+
	S_a	1.0	-	-	-	-	-
Barium	S_h	80	-	-	-	-	16000+
	S_a	26.8	-	-	-	-	-
Cadmium	S_h	16	-	-	-	-	19.2
	S_a	7.2	-	-	-	-	-
Chromium	S_h	3960	-	-	200	1580	79200
	S_a	520	-	-	-	-	-
Copper	S_h	13.6	-	-	3000	82	41 to 6800
	S_a	10	100-500	250-1600	-	-	-
Iron	S_h	2240	-	-	18000	80640	N/A
	S_a	1000	-	-	-	-	-
Lead	S_h	224	-	-	-	-	44.8 to 1434
	S_a	88	300	80	-	-	-
Manganese	S_h	40	-	-	5000	400	1600
	S_a	16	400-700	500+	-	-	-
Mercury	S_h	10.4	-	-	-	-	6.24
	S_a	4.4	-	-	-	-	-
Molybdenum	S_h	36.4	-	-	500	36.4	728 to 1092
	S_a	16	5-100	200-4000	-	-	-
Nickel	S_h	68	-	-	50	6.8	760
	S_a	68	-	-	-	-	-
Selenium	S_h	160	-	-	200	64	224 to 22400
	S_a	160	4-10	7-15	-	-	-
Silver	S_h	22.4	-	-	-	-	9.0
	S_a	10	-	-	-	-	-
Tin	S_h	332	-	-	-	-	9960 to 43160
	S_a	132	-	-	-	-	-
Vanadium	S_h	1120	-	-	25	56	22400
	S_a	720	20 (Young)	35+	-	-	-

[a] Calculated from Table C-11 on the basis of: Air Dry Weight = 0.25 Wet Weight.
[b] From Table C-5.
[c] From Table C-4.
[d] Calculated on the basis of data in NAS80.
- (No data).

ATTACHMENT D

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY

INFORMATION PACKAGE FOR THE 1988-1989 WATER QUALITY ASSURANCE REVOLVING FUND (WQARF) PROJECT PRIORITY LIST

(EXCERPTS)

WATER QUALITY ASSURANCE REVOLVING FUND

PROJECT PRIORITY LIST

FISCAL YEAR 1988 - 89

I. NEW PROJECTS

The following new projects are proposed. Where interested facilities can be initially identified, the Department proposes to provide notice and allow the facility up to 90 days to respond prior to expending WQARF monies. The allotted funds will be reserved in case the parties failed to perform.

1. TOWN OF SURPRISE

The Town of Surprise has requested WQARF support to provide safe drinking water supplies in the vicinity of Reems Road between Greenway and Bell Road. The groundwater aquifer has DBCP, a hazardous substance in concentrations as high as 680 ppt, 34 times the action level. The area is growing rapidly and safe public water supplies will be needed to serve the increased population. It is anticipated that the funds will be used to design and construct a water treatment system for DBCP removal.

* 2. PINAL CREEK ACID MINE REMEDIATION

The Department proposes a project to address acid mine drainage in the Globe/Miami area. A contaminated groundwater plume estimated to be 17 km long, 0.6 km wide, and 50 m deep contains highly acidic water and significantly elevated levels of copper and other contaminants. This groundwater contributes to Pinal Creek which contains perennial surface flow in its lower reaches and is tributary to Roosevelt Lake. Projections indicate that highly elevated levels of copper and other contaminants may reach Pinal Creek, and hence Roosevelt Lake, within 6 to 25 years. In addition, private water supplies in the Wheatfields area may be adversely affected. Potential sources of the contamination may include the copper mining areas in the upper portion of the watershed, wastewater treatment facilities, and other discharges. Prior mitigation consisted of draining acidic wastes from the large unlined lake formed behind waste and tailings piles. However, there may be a continuing threat to groundwater and Roosevelt Lake. The Department will notify the primary responsible parties. WQARF monies will be reserved to conduct remediation work should responsible parties fail to address the contamination. The Department will be available to assist responsible parties in developing the remediation work plans.

3. TUCSON AIRPORT, TUCSON

The City of Tucson has proposed work in the Tucson Airport Area, which is a federal superfund site with groundwater contaminated by VOC's. The feasibility study alternative V was selected as the best remedy and the City of Tucson is seeking WQARF support for its implementation. The project objectives include; halting the migration of groundwater contamination which threatens downgradient drinking water wells, restoring a portion of production capacity lost to contamination, and restoring the aquifer to drinking water quality. The anticipated activities include review of well information, design of extraction and collection systems for contaminated groundwater, design of air stripping plant, construction, aquifer monitoring, and operation. Negotiations between EPA, the State, and the responsible parties are in progress. An agreement for the responsible parties to perform the work will negate the need for WQARF monies. In order to expedite the cleanup, the Department will reserve the WQARF dollars to conduct the work, if negotiations fail.

4. GOODYEAR WATER SUPPLY

The City of Goodyear proposed a WQARF project to respond to groundwater contamination in the area. Goodyear is the location of the Phoenix-Goodyear Airport Federal Superfund area where volatile organic compounds from local aerospace industries have contaminated the aquifer. The City has been, and continues to manage water supplies and water planning to provide adequate supplies but has requested additional WQARF funds to support this effort. The proposed project will provide for city well monitoring, development of a water plan to address the contaminated area and a detailed groundwater quality investigation to facilitate the location of new production wells.

5. BITTER CREEK, COTTONWOOD/JEROME

Mines located in Jerome produce acid mine drainage which traditionally entered Bitter Creek and flowed into the Verde River above Cottonwood. During that time, Bitter Creek contained very acid water with high levels of heavy metals, of which a portion plated out in the sediment, and the remainder entered the Verde River. In more recent years, some impoundments and other efforts have been made to contain the drainage. However, it is unknown whether the containment is adequate to protect both surface and groundwater in the area, and it is unknown whether the heavy metals in the sediment of Bitter Creek present a continuing source of contamination. The Department will notify the responsible parties. WQARF monies will be reserved to conduct remedial work should the responsible parties fail to address the contamination. The Department will be available to assist responsible parties in developing a remediation work plan.

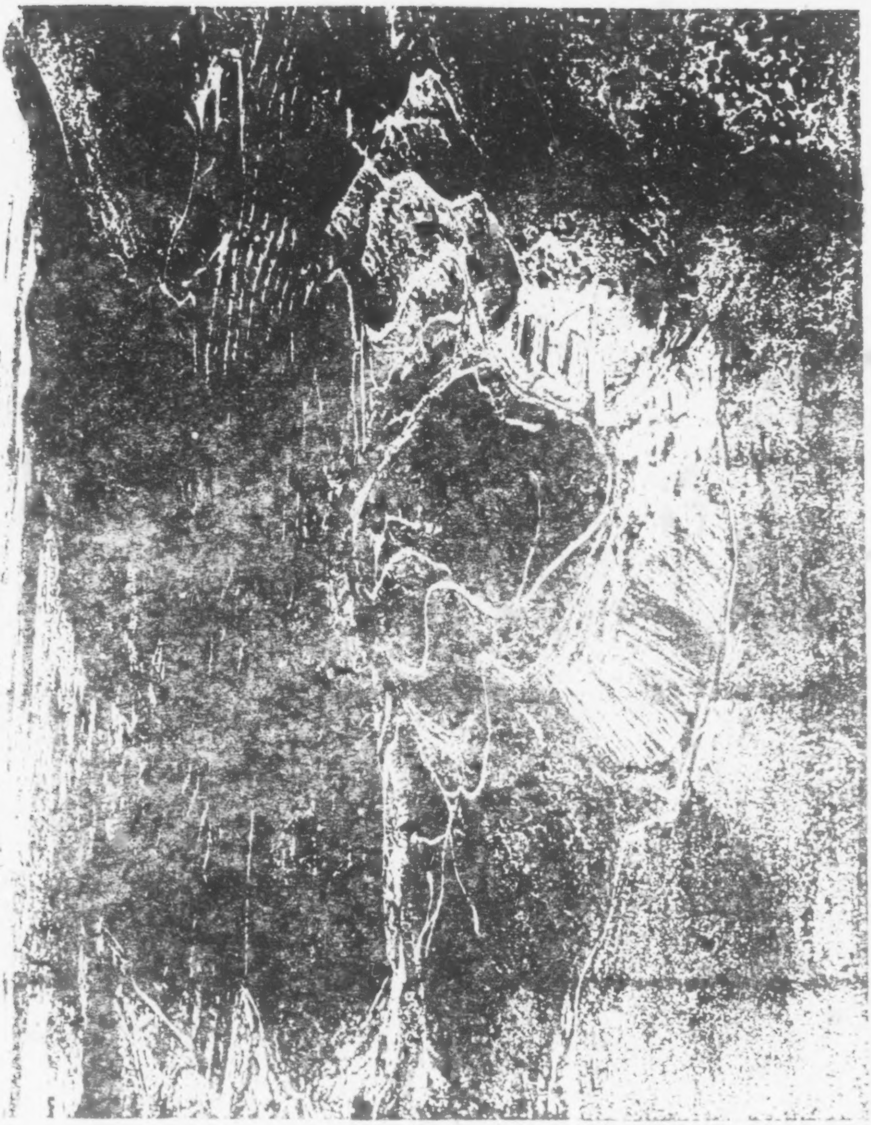
6. LOWER/MIDDLE GILA RIVER

The Department proposes work in western Maricopa County in a very large undefined area which potentially may include the Gila River from Buckeye west to the Painted Rock Borrow Pit, and the agricultural acreage, canals, treatment facilities and other river discharges contributing to this portion of the river. Data collected in the Gila River indicate excessive levels of pesticides, including DDT and toxaphene, as well as other contaminants, in both sediments and wildlife. For instance, DDE levels in birds are among the highest in the United States. The Department proposes to: (1.) identify any immediate remediation efforts, which may include structural controls or management controls, to deter further contamination of the system, and (2.) to identify potentially responsible parties who may contribute to remedial actions in the area.

ATTACHMENT E

AERIAL VIEWS OF PHELPS DODGE-BISBEE PIT MINE AND LEACHING OPERATIONS

APRIL, 1990



Senator **Bumpers**. Mr. Gregory, I have read your entire statement, which incidentally is very comprehensive and we thank you very much for that. It is a very thoughtful statement with thoughtful recommendations.

Mr. Belsky, starting with you, as a former small businessman, and for the past several years either ranking or Chairman of the Small Business Committee here in the Senate, you really hit a nerve when you talk about whether or not what we are about to—or what we hope to do here—is going to discriminate against the small operators.

Now, you know, bankers do not have any hesitancy about discriminating against people with no assets. They just turn them——

Mr. **Belsky**. They turn them down.

Senator **Bumpers**. They say no.

Mr. **Belsky**. Right.

Senator **Bumpers**. And we cannot make everybody whole, of course, and it seems almost harsh to say to these people, you cannot compete. Yet, we are not—we would still allow under my proposed bill, we would still allow the small operators to file claims. The only place that this might be discriminatory would be on their ability to make a bond.

I mean, there is no point in small or big operators filing a claim, unless they are prepared financially to work that claim, if it turns out——

Mr. **Belsky**. Correct.

Senator **Bumpers** [continuing]. To have anything of value. So what we are talking about, and I take it—and if there is more to it, do not hesitate to take issue with me—but what we are talking about, essentially, where this problem occurs is in the bonding requirements. Is that a fair statement?

Mr. **Belsky**. Correct. Small operators just do not have the capital, liquid capital, in which to convince a surety company that, when it comes time for reclamation, five years, 10 years, whatever it might be, that they will still be in business and be able to perform that—the duties of the bond.

Senator **Bumpers**. So we are placed in a very undesirable position of saying, for example, to some fairly small operator with limited financial resources——

Mr. **Belsky**. It does not have to be that small.

Senator **Bumpers**. No, I understand that. I am not—I do not want to get into the relative financial worth of somebody. But my point is this, we have to make a decision. Are we willing to let somebody pollute or not reclaim or both in the interest of protecting those less financially able to do these projects?

Mr. **Belsky**. To some extent I can see your point. But I also—the problems that the surety industry has with issuing a bond under the federal bond form, there are two key areas there. They are very worried about being dragged into court under—as a deep pocket. They write a bond for $100,000, 10 years from now, when it comes time for reclamation, the rules have changed. What was a hazardous material now controlled under one law in 10 years might be reclassified. And then, they are stuck under the joint several liability coverage, and it might go $20 million based on a $100,000 bond because of part ownership or whatnot.

And number two is the fact that the insurance companies monitor the bonding—or the insurance companies monitor the mining companies on an annual basis. They get financial statements, they do financial reviews, they look at—some even request an annual audit of the reclamation stage. What is our exposure today, just to make sure they have enough collateral.

And if the financial status of that company has changed significantly, mostly in a downward manner, they want to be able to call that bond today and say, hey, stop. We want to get off the land that has not been touched. And we will accept the responsibility for the lands that are already disturbed, because that is what we are on. But they want to be able to call that bond today. And under the federal bond form, they cannot.

And so once that bond form is issued, it goes. And the cancellation provision, which many states have but the Federal Government does not, would be very helpful—would be very helpful to the—in having a—one, it would reduce the uncertainty which would reduce the collateral that the operator has to post, and it would interest other surety companies in getting into the business.

Senator **Bumpers**. You know we have—the Federal Government issues hundreds of thousands of contracts a year, and virtually every one of them require a bond.

Mr. **Belsky**. Correct.

Senator **Bumpers**. Now, in the Small Business Administration, we have a surety bond program where we try to help small business make bonds, so they can compete. But we also have to have a reasonable degree of certainty of performance, even in those cases. And there is some, I suppose, you can always say, that if you are a person that is bidding on a public contract that invariably requires a bond, you just cannot make everybody whole.

I mean, we cannot make this a perfectly egalatarian society, I used to think as an undergraduate student at the University of Arkansas that we could. But as you get older—Was it Churchill who said that a young man that is not a liberal has no heart, an old man that is not conservative has no brains?

As you get older, you realize that you cannot make society perfect. And there is some discrimination, and there are differences. The question is, should we make this kind of an exception, when you consider the potential damage?

Mr. **Belsky**. I think that the exception is warranted for one reason in the fact that the contract that they are bidding on runs such a long time as has been brought out; 20 years, 30 years, or as the gentleman that talked about extending that guarantee out 200 years, there is no—surety people are in a business. They have to answer to their stockholders as well. And they cannot bet that company's future at all, even if it is the largest mining company in the world. They are not going to guarantee—who is to say how long they will be in business. The surety companies would not write the bonds.

Senator **Bumpers**. Excuse me just a second.

Do you know of any states that have bonding pools?

Mr. **Belsky**. I am active right now in Nevada setting up a bond in pool. I believe Colorado has one, and I think, Montana has one.

Senator **Bumpers**. Is it working?

Mr. **Belsky**. It is my understanding they are to some extent for the small operators.

Senator **Bumpers**. The reason I ask that—we held a hearing in the Small Business Committee recently on the financial requirements—which are very stringent—placed on service stations for underground storage tanks and leakage.

Mr. **Belsky**. Sure.

Senator **Bumpers**. I'll come back to that, in just a minute. Mr. Parks, you've got a problem out there. I'm talking about the Church Universal and Triumphant.

Mr. **Parks**. I could laugh a lot.

Senator **Bumpers**. But in any event, I know my home state is setting up an insurance pool, so that some of the small service station owners can afford the kind of insurance they are going to have to put up in order to have these underground storage tanks. And I am just wondering why we could not do that same thing, or at least, the States could do that to protect small operators who want to go into mining.

Mr. **Belsky**. Well, actually, I am working presently with the insurance industry to set up one on the private side—to set up our own pool to take that. There are some problems. However, we have got some interests there.

Senator **Bumpers**. Mr. DeGuire, are you with Newmont? Is that correct?

Mr. **DeGuire**. Yes.

Senator **Bumpers**. You stated in your testimony that reclamation cannot be passed on to the consumer. If everybody had to reclaim, you could. Could you not?

Mr. **DeGuire**. Well, if everybody in the world had to reclaim, yes.

Senator **Bumpers**. Well, is that the big problem? International competition?

Mr. **DeGuire**. Yes.

Senator **Bumpers**. Pardon?

Mr. **DeGuire**. Yes. In coal mining, most of the coal is sold domestically, and they are sold under long term contracts. And those contracts provide for reimbursement for reclamation expense.

Senator **Bumpers**. Do you think that foreign competition is a sufficient justification to allow people to pollute or not to reclaim?

Mr. **DeGuire**. No, I do not think there is any justification to allow people to pollute.

Senator **Bumpers**. Were you just drawing a distinction on that point between coal and hard rock minerals?

Mr. **DeGuire**. Yes, I was.

Senator **Bumpers**. Does your company do heap leach mining?

Mr. **DeGuire**. Yes, we do.

Senator **Bumpers**. You do not have to answer this if this is proprietary information. But if there is an industry figure, what is the average cost of producing an ounce of gold by that process?

Mr. **DeGuire**. Our figures are proprietary, and I do not know if there is a published figure on that. But I can look into that and see if there something available and send them to you.

Senator **Bumpers**. You stated that for your company, most of your mining operations are on private property?

Mr. **DeGuire**. That is right, about 85 percent.

Senator **Bumpers**. About 85 percent? What is the average royalty you pay to the landowner?

Mr. **DeGuire**. I do not know.

Senator **Bumpers**. Do most landowners that enter into contracts with require bonds for reclamation?

Mr. **DeGuire**. Not that I am aware of.

Senator **Bumpers**. They do not?

Mr. **DeGuire**. No. Most of the land——

Senator **Bumpers**. How about the States? Do not the states require reclamation on private lands?

Mr. **DeGuire**. Yes, Nevada does. As I state, Nevada just passed——

Senator **Bumpers**. So even if you entered into a contract with me as a private landowner and the contract provided—had no provision relating to reclamation, and this was in Nevada, the State of Nevada would have a law covering it? Is that correct?

Mr. **DeGuire**. Yes, they do. Both private and public lands.

Senator **Bumpers**. And that would be true, I assume, in virtually 47 states then? I heard testimony that there are three states. Is that not correct, Mr. Miller?

Mr. **Miller**. I think the three states that do not have reclamation laws are the three states that have major mining industries there. And I was referring primarily in that case to the Western States of Alaska, New Mexico, Arizona. But I think that there are many states that have a very small mining industry that do not have specific reclamation laws. Do you know that number? How many states have reclamation?

Mr. **DeGuire**. Nationwide? Only in the Western States, just Arizona and New Mexico and, I assume, Alaska.

Senator **Bumpers**. Mr. Fitzpatrick, can you give me any kind of a ball-park figure on what your company pays in royalty for gold?

Mr. **Fitzpatrick**. Our leases with private owners generally call for a royalty depending upon the value of the property. I would say the vast, vast majority of them are in the range of 1 percent to 3 percent of the net smelter return.

Senator **Bumpers**. Of the what?

Mr. **Fitzpatrick**. Net smelter return. Net smelter return is a calculation that basically gets you down to the gross amount that the miner receives after having the refinery transportation and tax charges taken from the value of the product. In other words, if we ship a concentrate, for example, to a smelter the calculation of the revenue received by the mine is done through a series of computations where the smelter will take the estimated gross value of the product by taking the weight or the quantity times the mineral price.

For example, if you are sending him a concentrate with 1,000 pounds of zinc, he will first of all calculate a gross price or value for that zinc, say, $.50 a pound, 1,000 pounds—$500. From that he will then deduct smeltering refining charges, for example, $60 a ton. He may then deduct what he calls impurity deductions, such as, for contaminants like cadmium or arsenic.

He may take a moisture deduction, a quantity loss deduction. Because he cannot recover 100 percent of what you sent him; he has losses in his process. And then finally a transportation deduction.

So that after those deductions are taken out, you have what is referred to as a net smelter return. And that is the basis of the royalty. To go back to my example, you may ship a concentrate, for example, that has a theoretical value of $500 per ton, after the deductions from the smelter, you may get $360 per ton. That becomes the basis of the royalty to the landowner.

Senator BUMPERS. And he would get 1 percent to 3 percent of that figure?

Mr. FITZPATRICK. 1 percent to 3 percent of that figure, and it will vary of course depending upon—pardon me, the value of the product will vary depending on what is being mined, whether it is a base metal, gold, silver or whatever.

Senator BUMPERS. Do you have any mines on the national forests? On the national forests?

Mr. FITZPATRICK. Yes. Senator, I think five of our six mines have some quantity of federal land. I think in all cases, the ore body is located on private land. But we may have some peripheral areas that may be used for processing or for access that involve federal lands of some kind. But we have two properties in Montana that have federal lands within their permit boundaries.

Senator BUMPERS. Are all of those bonded?

Mr. FITZPATRICK. All of them are bonded under the—all of our mines are bonded either under the Nevada statute or under the Montana statute.

Senator BUMBERS. But not under federal law?

Mr. FITZPATRICK. No, again, we are dealing with a situation where the federal agencies have memorandums of understanding with the state. The state in this case is the lead agency. And they are the entity that holds the bonds.

Senator BUMBERS. Do BLM and the Forest Service routinely defer to the state on bonding, if that state requires bonding?

Mr. FITZPATRICK. That has been our experience. It tends, however, I think to be a kind of a function also of the nature of the project and, where it is at. For example, if most mining activities in Montana are clustered in the southwestern portion of the state, it is very accessible there to state authorities. In other places that are farther away from Helena, it may be logistically more difficult for the state to get there. And in some cases the federal agency will then take the lead.

Also in some cases, if there is a complete 100-percent Federal ownership of the property, and it is simply claims that the operator is developing or working on, the bond may be held by the federal agency. It is kind of a matter of negotiation between the two parties.

Senator BUMPERS. Mr. Fitzpatrick, does your company ask for patents on land? Or do you just ask for the right to mine it?

Mr. FITZPATRICK. We have never to my knowledge ever patented a claim.

Senator BUMPERS. How about yours, Mr. DeGuire?

Mr. DEGUIRE. We do both.

Senator BUMPERS. You have received land for that $2.50 to $5 an acre?

Mr. DEGUIRE. I do not know. I do not believe Newmont Gold has, but other Newmont affiliates have in the past.

Senator BUMPERS. I am sorry, I did not understand.

Mr. DEGUIRE. Newmont Gold, the parent company is Newmont Mining Corporation, and various affiliates of Newmont Mining have received patented land in the past.

Senator BUMPERS. Do you think that is fair, for people to be able to buy land from the government for $2.50 an acre?

Mr. DEGUIRE. Yes.

Senator BUMPERS. You do?

Mr. DEGUIRE. Yes, for the amount of investment and the risk that mining companies must take. Newmont Gold spends approximately $40 to $50 million a year to explore. The amount of capital that is required in order to develop a mining property is enormous, and there is no guarantee that spending the $40 or $50 million a year that you will find.

Senator BUMPERS. But you do not need—you are going to spend that same amount of money just with a mining permit. You do not have to own the land, do you? You can go to the Forest Service or BLM. You can stake those claims for whatever land you want, and you can prospect it and tool around with it for 5 years, and you do not have to own the land in order to make this investment. All you have to have is BLM or Forest Service permission to mine it.

Mr. DEGUIRE. That is true.

Senator BUMPERS. So why should the government be your benefactor and actually give you a deed to the land for $2.50 an acre because you are in the mining business? They will not do that for you for oil and gas, and they will not do that for you for coal. What is different about hard rock minerals?

Mr. DEGUIRE. I think the risk involved. It is much harder to find non-coal minerals.

Senator BUMPERS. Well, I can bring you a lot of oil and gas people in here to tell you the risk is not as great.

Mr. DEGUIRE. Perhaps that is true.

Senator BUMPERS. You are not offended by the fact that people can actually buy land from the government for $2.50 an acre by simply staking four corners of a 20-acre tract?

Mr. DEGUIRE. Not if they are willing to spend hundreds of millions of dollars and generate jobs, no, I am not. And pay that amount of money in taxes as well.

Senator BUMPERS. Well, do you think the same thing ought to be true then for oil and gas operators who are willing to spend millions of dollars drilling?

Mr. DEGUIRE. I am not familiar with the oil and gas industry.

Senator BUMPERS. How about coal?

Mr. DEGUIRE. I am not that familiar with coal operations.

Senator BUMPERS. Well, you do not have to be a rocket scientist to know what you do to mine coal.

Mr. DEGUIRE. I understand that.

Senator BUMPERS. Mr. Parks, I was in Yellowstone during the big fire, and completely aside from the fire, I was a little bit shaken by the fact that all of that land north of Gardiner had been bought by the Church Universal and Triumphant. I had no objection to them owning the land. What I objected to was the fencing and the things they were doing, and you and I both know that the elk, the moose, the deer and bison come down out of the park along the Yellowstone River, and that is where they do most of their grazing in the wintertime. And now I see that that same church which has been busily engaged in building underground bomb shelters, I guess they do not believe Gorbachev. They are building these bomb shelters, and they put all these underground gasoline tanks there. And now you have got sort of leaking underground tank disaster on your hands, have you not?

Mr. **Parks**. That is correct, Senator.

Senator **Bumpers**. Have you been down to look at any of that to determine whether or not that oil is going to get into the Yellowstone River or not?

Mr. **Parks**. Yes, Senator.

Senator **Bumpers**. This has little to do with what we are here for today, but it is——

Mr. **Parks**. I guess there is a certain fascination about a report from the front in the middle of a combat zone, which is rather what I feel like right now. I have been living in the middle of—somebody asked me a while back, and I said I think I now know what an ant feels like who used to live in a hill somebody just put a boot through.

It has been an experience which I wish I had never had to go through and, of course, it is not over. There are 35 tanks up there, 600,000 and some odd gallons of fuel. We know of three ruptured tanks and a missing 31,000 gallons as of the day I left.

Senator **Bumpers**. That was the last figure I saw, 31,000 or 32,000 gallons.

Mr. **Parks**. Yes. That is a couple days old, but we have no assurance whatsoever that all the other tanks buried in the middle of the winter for frost rupture are not equally at risk, and it is an ongoing disaster which I think we have not heard the last of by any means.

I wish I could give you some assurance that it was all going to be hunky-dory tomorrow, but I do not believe that.

Senator **Bumpers**. Mr. Fitzpatrick, do you know what the usual proportion of gross revenues from mining to the cost of reclamation is normally?

Mr. **Fitzpatrick**. Off the top of my head, I could not say. I would say somewhere between 1 and 5 percent, depending upon the mine.

Senator **Bumpers**. The statistic I have seen is 1 percent. I just wondered if that was true in your company. How about you, Mr. DeGuire?

Mr. **DeGuire**. I do not have a figure for that. Nevada—the Nevada reclamation regulations, which are being developed as the law that I talked about—are supposed to come out today. And so, once those come out, we will be able to determine what those ratios are and what exactly the costs will be.

Senator **Bumpers**. OK.

Gentlemen, we have several questions that we will want to submit to you in writing and I hope you can reply within a couple of weeks from the time you receive the questions. We would appreciate that very much. Your testimony has all been very interesting, and I know some of you have traveled long distances to be here today and spent a lot of time preparing your testimony, and we want you to know that we are most grateful to all of you.

I am sorry, Senator Burns, I thought you had left a while ago. Here is a man from the mining country. Go ahead.

Senator BURNS. Let me tell you for the record right now that Mr. Parks ties a heck of a lot of flies, and they are all good, especially a salmon fly that he makes, and it actually catches fish. And he does have a terrible problem up there, and I hope they are doing the right thing by getting that thing cleaned up. I do not know.

I understand that your friend down at Emigrant is going to go to war with them, but——

Mr. PARKS. If you are referring to State Senator Story, I do not think—he had no intentions of going to war, but he was a little disturbed to wake up one morning to find a gun turret in his backyard.

Senator BURNS. That is what I hear.

Senator BUMPERS. A gun what?

Senator BURNS. I will tell you over coffee. This is getting to be—there are getting to be some great stories up there.

Mr. Gregory, I have just a couple of questions here to clear up. I just cannot fathom in this day and age—Arizona does not have a reclamation law. Is that—did I hear you correctly on that?

Mr. GREGORY. That is true, sir.

Senator BURNS. Why not?

Mr. GREGORY. That is hard to say.

Senator BURNS. I mean, you have got until 4:15.

Senator BUMPERS. For the same reason I have not been able to get this bill passed.

Mr. GREGORY. I am sure that has a lot to do with it. Arizona traditionally, of course, has been politically controlled by the mining industry and by the cattle industry, and that has not changed to a very great extent. What we have been able to do in Arizona in the way of environmental law is in 1986 we passed what I understand is one of the best water protection laws, aquifer protection laws in the country. That does not require reclamation. It does require that any new mining operation has to undergo some kind of a permitting system to guarantee that there will be no water contamination. And that law is retroactive, although there are a great many loopholes that make retroactivity to the mines a very slow process.

Senator BURNS. Mr. Parks, I will just—I read your statement here and picked out a few things. The Noranda project that you refer to up at Cooke City, I do not have all the information on it, but I understand that is an old mine site. Is that correct?

Mr. PARKS. Mr. Chairman, Senator Burns, yes. This is in a historical mining district which is under a serious exploration for redevelopment. A new ore body has been located in the area, and so we have got a serious project underway here. The timetable now looks—they are talking about trying to have the permitting process concluded sometime in 1992.

Senator BURNS. On page 3 or 2, whichever way you want to look at it here, your statement indicates that under Montana law miners who disturb less than five acres or remove less than 36,000 tons of rock annually are exempt from bonding and reclamation requirements. I believe that law was changed. Is that correct, and there are just very few that fall outside that law, now. Was not that correct, that law?

Mr. **Parks**. Not exactly. The small miner exclusion is still in there. The law was changed so that if you are using cyanide in your operation, you are now required to have a permit without regard to the size of your operation. And there is underway a process to review those reclamation requirements, but the small miner exclusion still exists. But if you are using cyanide, there is no small miner exclusion anymore, and that was just passed in the last session. They are just now adopting the rules. They are in the commenting process, and I should have a formal set of rules. They have an interim set of rules out there.

Some of the miners are unhappy with the fact of being required to comply.

Senator **Burns**. I have no problem with the reclamation laws because I just think they are necessary, and I just do not understand why Arizona does not have one.

And then on page 4 we turn up a little statement that mining operations by their very nature will continue to cause damage—down at the bottom of the page there—on damage to productive lands and water resources—even current regulations, if those regulations are adhered to. You go on to say several large mines in Montana have signed as responsible operators and take steps to ensure environmental protection which nevertheless inevitably cause significant long-term impacts to the environment.

I am wondering if your message here today would not be that you should do away with all permit mining? Is that the conclusion you are trying to come to, here?

Mr. **Parks**. No, Senator, it is not. What I am trying to get people to come to the conclusion is that perhaps some deposits are not worth mining today, that the process is not adequately accounting for all the costs associated with the mining operation, and until the industry can come to terms with internalizing the costs of any given operation and applying it to the value of the ore body, they need to consider then whether or not that ore body is worth mining.

If your mining operation is going to, as one operation did, essentially destroy a small stream and turn it into an underground discharge from an adit instead of being a surface stream, then think about the costs of doing that and factor that into the planning process. And then if it no longer pays out, do not mine until such time as that ore body is of such value that you can afford to pay for that cost.

Senator **Burns**. You are concerned about adequate bonding, and I think that would be a concern of all of us here and bonding levels. Montana revised its bonding policy, I think, in 1985 to more accurately reflect the cost of actual reclamation. Is this new policy working in your estimation and if not, why not?

Mr. **Parks**. It is still insufficiently flexible to account for two major factors. One is site-specific criteria, and the other is the cost of inflation over time. The site-specific criteria, for instance, this new world project we were mentioning before, the bulk of that is at 9,000 feet in an area that the Forest Service research lab has been trying to establish reclamation, has some reclamation study plots in the historical mining area.

The conclusion that you would come to from reading their reports on this reclamation project, which has been ongoing for 20 years, is that reclamation there can never be anything but cosmetic and that almost without limit you could pump money into that ground without materially proceeding past that point in reclamation.

Some people define reclamation, I think, as establishing some sort of stable surface contour, and that is reclamation. I would not define reclamation that way. I would define reclamation as restoring land to some level of productivity, and that is a different perception of what reclamation means.

So, we are not getting reclamation in cases where it is not taking adequate account of what the circumstances are, and then we set a bond today. Five years from now the costs are different, and there is not adequate provision for reviewing the value of the bonds. Once it is set, we are pretty much stuck with it.

Senator BURNS. When you talk about productivity, before there was ever any mining there, was there any productivity? I mean, some areas where there was nothing going on before—and I do not see how you would gauge that, but I will also ask this. Once it has been reclaimed—and I would go along with Mr. Belsky's remarks here that maybe, sure, we could go and increase the bonding as, say, the mine grows or if the danger of more costly reclamation in some judgment, then as the fear dwindles, should not the bond also be lowered and phased out?

Mr. PARKS. If the risk and the cost to reclaim has gone down through work that has already been done, then a bond could be adjusted in either direction. Seldom do I see a hard rock mining site in particular that operates in such a way as that can be done.

Senator BURNS. Well, say——

Mr. PARKS. If it could be, sure. Theoretically there is no particular problem with that. Sites—you know, productivity from a site depends also on what kind of values you are considering. You have wildlife values, you have watershed protection values, you have, you know, a surface water production. When you are talking about a very high altitude site, that may be its highest value is in surface water production. And, as you know, in Montana an adequate water source for domestic and stock and irrigation consumption that is a safe and usable water source is, you know, kind of our critical resource.

Senator BURNS. It sure is.

Mr. GREGORY. Senator Burns, could I comment on that, please?

Senator BURNS. Yeah.

Mr. GREGORY. In terms of this natural productivity, a good example of that is again the mine at Bisbee, which is a historic mine and has had considerable impacts. One of the common effects of mining in the West, and especially, I think, in the Southwest, has been the virtual denudation of the hillsides and the mountains around the mine or the timbers were used for shoring up the mine shafts and the stopes.

That has caused a considerably impact on the environment, on the complete ecosystem for several square miles in the Bisbee area where all of the pine timber which was originally the pine forests on top of those mountains has gone, has been replaced by scrub growth, by juniper growth, and by a more or less lack of undergrowth so that the erosion problem is much, much greater than it ever was in the natural situation.

That has led to sedimentation of what few streams are left as well. Of course, we have the problem of the streams being dried up because the mines used the water. There is a whole compounding of environmental effects, all of which, of course, have value. So, when we are talking about the productivity, we are talking about a large ecosystem problem, and we have to consider that in terms of the value of the mine.

Senator **Burns**. I guess—I would like to thank each and every one of you for coming today. I know you traveled a lot of miles, especially Mr. Parks, and I sure suffer with you with the problem you have got up there. I do not know what we can do, but I would ask Dr. Miller one question, I guess. I just cannot help asking you. Is it okay to run cattle on BLM?

Dr. **Miller**. Sure.

Senator **Burns**. That is all I wanted to hear.

Senator **Bumpers**. As long as the land they run on does not have any gold or silver under it.

Dr. **Miller**. I might mention since you asked the question, the BLM, I just reviewed an environmental assessment last week that had 27 AUMs removed from BLM land, and the BLM decided that that should not require a reduction in the amount of cattle grazed on that allotment. So, I think the BLM thinks that you cannot only graze cattle on the land, but you can graze cattle no matter how many you want to put on the land, and I do have an objection with that.

If I could make one just quick comment about State versus Federal reclamation laws, too, I was very much involved and I want to recognize Newmont's contribution to the State of Nevada reclamation regulations also. But they were designed for state, private land and state land. They do not substitute for Federal reclamation regulations.

The number of people handling reclamation regulation in Nevada is going to be from the state. There is no way that group of people can handle the reclamation on public lands, both BLM and U.S. Forest Service, and there is no way they should be asked to do that either unless there is a new, new big funding mechanism, which I am not proposing.

It is critically important. There is public and private land. Public land is owned in common by all of us, and we should have a public mechanism to require reclamation for that. So it is not sufficient, even if Arizona and New Mexico and Alaska all pass reclamation laws, it is not sufficient to rely on state reclamation laws.

Senator **Burns**. Well, usually it always seems to me that usually sometimes states pass—I think Montana has a very good reclamation law and environmental laws up there, but sometimes we get a little bit lax. I know where you are coming from. I have some concerns with standards, as Mr. Gregory said, national standards. There are different areas different, and as along as those areas are different, climate is different, soil makeup is different, everything is different, then you cannot apply the same standards throughout the whole world. But I appreciate your testimony and, just like I say, I read through most of this and I appreciate all of you and the information you bring to this committee.

And again, Mr. Parks, I sympathize with you up there. I think they have got—I will tell you what. They tested the creek this morning. If you would like to know, there is no detectable amount of fuel that is in Mulhern Creek. So, I think Envirocon has done a good job up there, and I think—it is a terrible, terrible thing, but who knows. They need all those guns to keep Dale and me out of that bomb shelter whenever the strike comes. We will not be able to get in.

Senator BUMPERS. Most of my mail today is not about hard rock minerals. Most of my mail is, Senator, please do not let them take my AK-47 away from me.

Senator BURNS. Thank you very much. Thank you, Mr. Chairman.

Senator BUMPERS. One final question, gentlemen. Dr. Miller, does Arizona and Nevada, those states, do they have severance taxes on hard rock minerals?

Dr. MILLER. Nevada does not.

Senator BUMPERS. Does not?

Dr. MILLER. There is a tax and, again, I would defer to the people who are paying them who know more about them than I do, but there is, I believe, a 5 percent net proceeds tax at the present time in Nevada. So, it is kind of a severance tax, although—I used that term previously, and it was called. They did not want to call it severance tax.

Senator BUMPERS. Mr. Parks, do you know—well, Mr. DeGuire, you have an operation in Montana?

Mr. DEGUIRE. No, just in Nevada. The Nevada tax is a net mine proceeds tax, and it amounts to some $7 an ounce.

Senator BUMPERS. $7 an ounce?

Mr. DEGUIRE. Yes. For last year.

Senator BUMPERS. In today's market that is less than 2 percent?

Mr. DEGUIRE. Well, it is—5 percent is the max, and it has been going up every year. It was $7 last year.

Senator BUMPERS. Does the State of Montana or the State of Nevada—they do not have a—on state lands—do any of you mine on State lands? No?

Mr. FITZPATRICK. Montana, Senator, does have a severance tax.

Senator BUMPERS. I am sorry?

Mr. FITZPATRICK. Montana does have a severance tax.

Senator BUMPERS. Senator Burns had advised me of that, but if not I was just curious. For example, for years, you know the U.S. Government leased its lands in the Ouachita National Forest for $1 an acre for oil and gas drilling, and the State of Arkansas, which owned quite a bit of land adjoining it, was getting anywhere from $100 to $1,500 an acre for theirs, because they were letting it go on a competitive basis. And I was just curious as to whether or not on State-owned lands. But if none of you mine on State-owned lands, I guess there is no way of knowing whether they have a royalty on it or not.

Mr. PARKS. Senator, I do not know if Montana has any operations on state-owned lands. If we did, our state's constitution would require them to have some sort of lease or royalty process to pay for the permitting operation on the state lands. That is separate from the severance tax, which applies no matter where in the State the mineral is mined.

We have both a severance tax and a gross proceeds tax. The severance tax is called the metals mines license tax. I mean, there are a bunch of different titles for things. But anyway, we do have a severance tax. And if there was a mining operation on state lands, there would be an additional price tag. That is, the state would collect some sort of royalty for the use of it however we chose to call it.

If the state did not, they would be instantaneously sued by every school district in the state because that is where the money goes.

Senator BUMPERS. Well, you probably lease—the States would probably lease their lands for mining on a competitive basis.

Mr. PARKS. I would anticipate that that would be the case. That is what the state does with the land, for instance, that they leased oil and gas operations.

Senator BUMPERS. Mr. Gregory, did you want to comment on that?

Mr. GREGORY. Yes, sir. I do not have the exact figures. I believe Arizona does have a severance tax. I am not sure that I can get that information to you. But I know that there was a recent attempt in the state legislature to either create a severance tax or to raise the amount. That is what I am not sure of. And that never got out of committee. But I know that they are talking about it there.

Senator BUMPERS. Thank you.

Gentlemen, I turn you over to the tender mercies of my distinguished ranking member from the great state of Idaho.

Senator MCCLURE. Mr. Chairman, thank you very much. I just wanted to make certain that my opening statement is inserted into the record——

Senator BUMPERS. It is.

Senator MCCLURE [continuing]. Of the proceedings this afternoon and to apologize for being so late getting here. No lack of interest in the subject matter, just the necessity to be in a closed hearing of the Defense Appropriations Subcommittee on a matter of some importance to the national security.

Senator BUMPERS. Senator McClure, without objection on your part or Senator Burns', I would like to put seven articles from the "*Sacramento Bee*" as well as an editorial from that newspaper and make that a part of the record.

Senator MCCLURE. That scurrilous junk?

[The material follows:]

B12 The Sacramento Bee Final • Monday, March 26, 1990

OPINION

The Sacramento Bee
Locally owned and edited for 133 years
JAMES McCLATCHY, *editor, 1857-1883*
C K McCLATCHY, *editor, president, 1883-1936* ELEANOR McCLATCHY, *president 1936-1978*
WALTER P. JONES, *editor, 1936-1974* C K McCLATCHY, *editor, 1974-1989*
GREGORY E. FAVRE, *executive editor* PETER SCHRAG, *editorial page editor*
FRANK R J WHITTAKER, *president and general manager*

The miners' poisonous legacy

Golden Land, Shattered Earth," Bee reporter Tom Knudson's series on the hard-rock mining industry, documents a sorry record of exploitation in which billions of dollars worth of public resources have been given away to industry, and billions more will have to be spent to clean up the mess that the industry left behind. Correcting that legacy of ravaged land and poisoned water will be a long and complicated process. But there's no doubt about what needs to be done to keep the situation from getting any worse: Repeal the General Mining Law of 1872 and replace it with a new policy for the public lands that reflects some of the realities of modern life.

Of all the anomalies Knudson uncovered, probably none is more bizarre than the fact that this wealthy and technologically sophisticated industry is still governed by a statute signed by U.S. Grant soon after the Civil War. Under this frontier legislation, mining corporations need no one's permission to begin digging for minerals on the public lands; if they find anything, the government has to sell them the rights to that property for no more than $5 an acre; no matter how much money they make, they never have to pay a penny back to the public in royalties; when they move on, they never have to restore the damage that they've done.

Merely correcting that ancient statute isn't enough. The repeated failure of both state and federal attempts to modify the 1872 act's worst effects over the last 120 years clearly demonstrates that such add-ons will not work. The law needs to be uprooted and replaced because the precepts on which it was conceived are no longer valid.

The law was designed to attract new industry and settlement to the West. But today the problem is one of striking a balance between industry and nature for the sake of all the settlement that has already occurred. Allowing the mines to operate unchecked may once have made sense to legislators who thought of the Western states as empty places with lots of land that no one would miss if it was wrecked. Today, we've not only filled up many of those empty spaces – we've also learned that even the remotest mountain stream can poison the water supplies of distant cities if an abandoned mine is left untended.

The mining companies resolutely oppose reform, contending that if their costs go up to protect the environment, it won't pay for them to mine in some places. But that's precisely the problem: Environmental degradation has always been part of the cost of their business. But under the 1872 act, industry never had to pay that price – the public did.

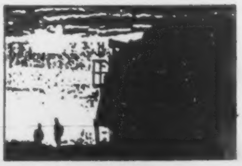
In the existing laws on coal mining and leasing public lands for oil exploration, Congress has models aplenty of how to erect the necessary environmental safeguards and apportion costs equitably. Miners should have to pay for access to these public lands, just as the oil companies do. They should have to meet the same environmental standards as anyone else. They should pay a royalty on the minerals they remove, with at least some of those revenues being set aside to clean up abandoned mines. And Congress must define a means – through bonding or a trust fund that all the industry would have to pay into – to ensure that the land will be restored once the digging's done.

The Sacramento Bee

© 1990 THE SACRAMENTO BEE
SUNDAY, MARCH 18, 1990
FOUNDED 1857 • VOLUME 267 • $1.00

SPECIAL REPORT

GOLDEN LAND, SHATTERED EARTH



Mining's toll brings new foes

First of five parts

By Tom Knudson
Bee Staff Writer

Like the rancher, the gunfighter and the mountain man, the miner stands tall in the annals of Western folklore.

It was the miner, after all, who helped bring the spark of civilization to the frontier, a spark that spread to a flame in states like California, Nevada, Montana and Idaho.

More than a century later, the miner's legacy is bronzed into the Western landscape. Towns carry names like Midas, Silver City, Eureka and Leadville. San Francisco calls its football team the 49ers. In Montana, which calls itself the Treasure State, the state motto is *Oro y Plata* – gold and silver.

But there is another side to the miner's legend, one not measured in dollars or troy ounces or ore formations. It is a story of widening environmental ruin, the abuse of federal mining laws, ineffective government regulation and the taking of precious metals from public lands – for free.

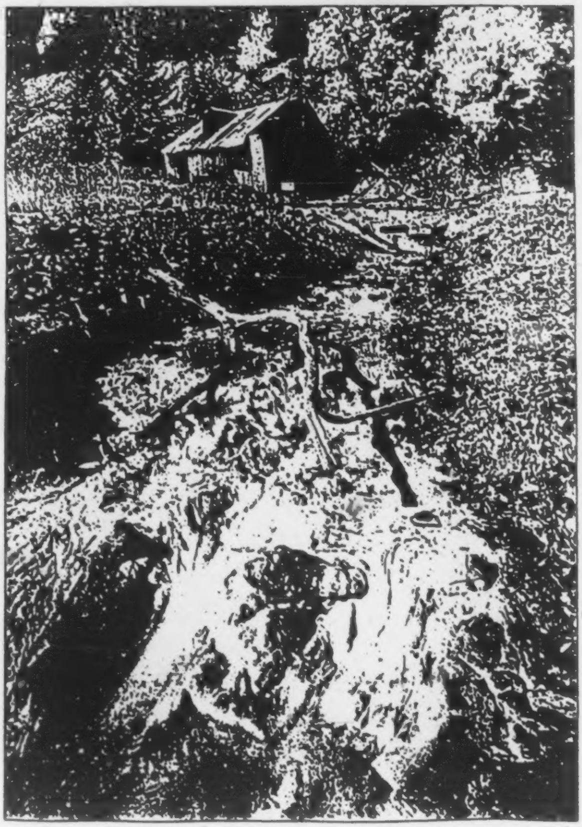
It is also a story not well known to most of America. But today – as the biggest gold rush in this nation's history sweeps across the West, changing the landscape, the small towns and the lives of the people forever – concern is growing.

Gone are the picks and shovels; in their place are fleets of giant earth-moving equipment gouging craters nearly as deep as Lake Tahoe in search of tiny specks of gold that can't even be seen. Up to 75 million ounces of this microscopic gold – overlooked by early prospectors – lies buried under Nevada alone.

Together, mining new and old have left a trail of shattered earth across the West.

- In Montana, the once majestic Clark Fork River is laden with mine poisons, including cadmium, mercury, arsenic, zinc and other metals.

See GOLDEN LAND, page A18



Acidic waste from an abandoned Montana mine leaches into Beartrap Creek. The creek flows into fishing waters of the Blackfoot River.

With more than 100 miles of river contaminated, the Clark Fork is the nation's largest Superfund hazardous waste site.

- In Colorado, 1,300 miles of mountain streams have been polluted by generations of mining activity – and up to 400 miles are essentially sterilized. In many places, the poisons have so permeated the environment that cleaning them up may be impossible.

In Leadville, a historic mining town where streams and yards are contaminated with heavy metals, a recent state study found elevated lead levels in the town's children.

- In California, thousands of acres of federal land set aside for mining are used instead for private recreational retreats, marijuana farms, junkyards, rent-free lots and other illegitimate purposes. And even where land is mined, it is often left in pitiful condition, marred by everything from abandoned vehicles to hazardous chemicals.

- Across the West, unclaimed mines dot the landscape like a bad case of measles. In Montana alone, state officials recently identified about 3,000 abandoned hard-rock mines. In many cases, old mines continue to seep with metallic poisons and acidic water, threatening everything from brown trout to people.

- In Nevada – the center of the new American mining boom – millions of ounces of gold are being lifted from federal land by foreign-owned companies – yet the companies pay no royalties to the United States. Sixteen of the top 25 gold operations in Nevada are owned in whole or part by foreign companies, mostly Canadian and British.

Also, at least 6,700 migratory birds – and perhaps many more – have died in the mines' cyanide-laced tailings ponds. And unlike the coal industry, the hard-rock mining business does not reclaim its giant pits.

"The mines come in and they just take and take and take," said Judy Lamb, a housewife who lives on an acreage outside of Winnemucca, Nev. "It's never been this devastating before. I think it's time we stand up and say, 'Look, we just can't have our environment and our way of life destroyed.' "

Mining industry representatives say the problems are being blown out of proportion. Most of the damage occurred years ago, they say, before environmental problems were a widespread concern. And they say that mining's environmental track record compares favorably with other industries.

"You still find DDT residues in all the bays and harbors of the U.S. – it's just not very visible," said Ray Krauss, environmental manager at the Homestake Mining Co.'s McLaughlin gold mine northwest of Sacramento.

"Mining is a handy whipping boy just because some of these things that are left on the landscape are very visible."

The gold boom rumbling across the American West is rewriting the history books. The 8.6 million ounces of gold mined last year – nearly 70 percent of it came from Nevada and California – was more than double the 3.9 million ounces produced during the peak year of the California gold rush, 1852.

And it's not just gold that's booming. In Arizona copper is king again. Copper production in Arizona jumped to 891,000 metric tons in 1989, up 18 percent from 1987. But because of rising prices, the value of Arizona's copper shot up 90 percent over the same period, from $1.37 billion to $2.6 billion. Overall, the nation's metal production – most of which comes from the West – jumped to more than $10.2 billion in 1988, up more than 80 percent from $5.6 billion in 1985.

But as the industry has grown, so, too, have the controversies. The disputes are being played out, in large part, on public land – the magnificent panorama of rugged mountains, deep canyons and high plateaus that blanket much of the West and is owned by the U.S. government and its citizens. Real estate of all kinds is involved, from dreary patches of sagebrush in Nevada to sun-dappled wilderness valleys in Alaska, from the sand-sculptured Oregon coast to the rugged high country of Colorado.

The disputes are as big and bold as the landscape itself. And they strike a deep and sensitive vein in the culture of the West.

On one side is a hallowed and time-honored tradition: the right to roam unfettered across public land searching for a new bonanza – another Comstock, Klondike or Cripple Creek – and the right to mine the lode once it's found.

On the other side is a wealth of more contemporary concerns such as keeping cadmium, arsenic, mercury and other poisons out of streams, cleaning up abandoned mine sites, making sure new ones are reclaimed and curbing the abuse of mining laws.

The conflict has touched off an epic battle, reminiscent of the clashes over water, grazing and wilderness preservation that have enlivened the West for so long.

On one side are those who would change the system. They are led by two powerful politicians from outside the West – Sen. Dale Bumpers, D-Ark., and Rep. Nick Rahall, D-W.Va. The General Accounting Office – the investigative arm of Congress – is also calling for reform, as are a number of national conservation organizations.

On the other side are those who like things the way they are. At the forefront of this group is the American Mining Congress, a historically powerful Washington, D.C., lobbying group. At its side is a stable of influential Western politicians, including Sen. James McClure, R-Idaho, and Sen. Frank Murkowski, R-Alaska.

At issue is U.S. mineral policy affecting more than 500 million acres of public land – enough to cover all of Texas, California and Montana – and a virtual treasure trove of gold, silver, copper, molybdenum, tungsten and other minerals. But despite the high stakes, the drama has unfolded in relative obscurity, in far-away canyons and on isolated mesas, outside the glare of television cameras or newspaper headlines.

■■■

Sixty-year-old Nevada cattleman Roy Risi has been around long enough that he is not easily disturbed. Coyotes, low-flying Navy jets, seasons of too little rain – nothing seems to phase him. But recently, Risi was upset by what he saw in the mahogany-colored hills near Eureka, Nev.

"I just couldn't believe it," he said. "Somebody unloaded a caterpillar and gouged a heck of a road up the canyon – to nowhere. It was a miner, and he wanted to put a drill rig up there.

"Now, if I did that – to get to water or something – oh, shoot, the government would fine the hell out of me. It would cost me thousands of dollars.

"But the miner – they got these old laws. The law is on the miner's side."

■■■

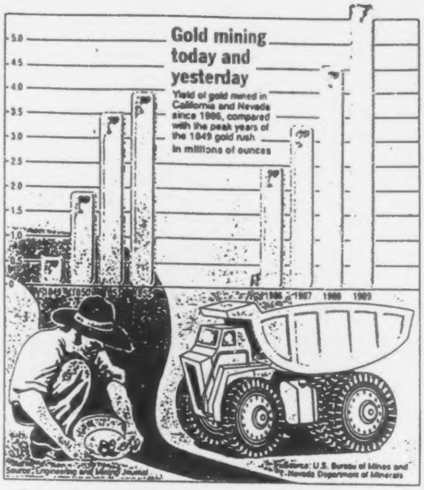
Turn the calendar back 118 years. Jesse James is robbing trains in Missouri, George Armstrong Custer is four years away from the Little Big Horn and Congress is passing a major new piece of land legislation – the General Mining Law of 1872.

Intended to open the West to mining and promote the settling of the frontier, the law gave the miner great freedom to search for and develop minerals on public lands. Its basic message was: If you can find it, you can have it.

Remarkable as it may seem, the 1872 mining law – which was signed into law by President Ulysses S. Grant – remains on the books today. In the rural West, in fact, it has hardened into legend, so esteemed that it has been likened to an 11th Commandment.

But today, this mythic law stands in the spotlight of the growing controversy over mining. The mining law, critics say, is a frontier relic hopelessly out of step with modern land use principles. Under the mining law, they point out, land managers have no authority to consider other uses for federal land. Mining is always the best use.

Beyond that, critics call the 1872 mining law a legislative free lunch that opens the door to abuse by everyone from drifters to land speculators. Under the mining law, any American can stake a claim to federal lands – and if valuable minerals are found, the land can be purchased for $2.50 to $5 an acre.



Source: Engineering and Mining Journal

Source: U.S. Bureau of Mines and Nevada Department of Minerals

Bee graphic/Machell Brooks

"It's just such an anachronism," said Stewart Udall, a former U.S. secretary of the interior who advocates changing the law. "It's clear that this law is in conflict with all of the environmental values and laws we've developed in the last 20 years."

Nonetheless, the mining industry stands rock solid behind the 1872 law, framing its arguments in a patriotic veil of national security, free enterprise and personal liberty.

"The 1872 mining law has done this country a world of good," said Paul Ramm, a gold miner who works in the Sierra Nevada foothills southeast of Sacramento.

"If a man can't go out and have a chance at becoming a millionaire, we're going to lose something important in this country. That's what made the West the West – a man had a chance."

■■■

From his office in Folsom, Deane Swickard oversees a small empire of federal land for the U.S. Bureau of Land Management. With roughly 10,000 mining claims under his supervision, Swickard deals regularly with the 1872 mining law. He does not like what he sees.

"It's the small things that people in Washington, D.C., don't dream of," he said.

"For example, you get somebody who comes into your office and says, 'My God, I'm scared to death.'

"They've got a house and next door there are these bums on a mining claim. And at midnight, they come over and knock on a window and say they want to use the phone.

"The guy's wife is home alone. His kids are scared. She doesn't want to let them in. And she doesn't want to say no because she's afraid they might burn the house down.

"And the homeowner says to me, 'Do something.'

"And I say, 'Under the 1872 mining law, we have to prove their claim is not valid.'

"And he says, 'You've got to be kidding.' And I see this not once, but ten times, a hundred times.

"These are abuses that the public shouldn't have to put up with. They have nothing to do with the mineral development of our nation."

■■■

The majestic Rocky Mountains in Colorado are a cradle for several of the West's well-known rivers, including the Rio Grande, Colorado, South Platte and Arkansas.

But there is little majesty to the birth of the Arkansas, which tumbles eastward onto the Great Plains. From the start, the river is fouled by lead, copper, cadmium, zinc and other pollutants seeping out of old mine shafts, tailing piles and mounds of waste rock.

Much of the waste comes from Leadville, a legendary mining region 100 miles west of Denver and the center of a major silver boom in the 1870s. The worst pollution comes from a nearby tributary called California Gulch, which dumps 250 tons of heavy metals – such as lead, cadmium and copper – a year into the river. Directly below California Gulch, there are no fish.

"We call that section of the river the dead zone," said Rick Anderson, a state wildlife biologist. "The rocks are stained white and orange. And if reach down into the stream bed, you turn up pieces of fluorescent-orange crud."

Sadly, the situation is not unusual. Travel the West and you will hear again and again the stories of streams fouled, fish killed and canyons despoiled by mining operations.

"If you drive through any place in Nevada where there has been a mine – and God only knows there are a jillion of them – always when a mine leaves, they leave a mess," said Judy Lamb, the housewife who has been fighting a company's plans to build a cyanide manufacturing plant outside of Winnemucca to serve the mining industry.

"If they don't leave holes or ripped-up ground, they leave junked equipment. Most of the mines, when they close, they're gone. You don't even know who they were," Lamb said.

Monitoring the damage is difficult because of the vast territory and rugged terrain. But in recent years, a number of state and federal studies have tried to get a handle on the situation. Here are a few of the findings:

- Unreclaimed mining activity has scarred more than 420,000 acres in 11 Western states, according to a 1988 GAO report. No one knows what it will cost to repair the mess, but the bill almost certainly will run into the billions.
- Mining waste piles up at the rate of 30 billion tons a year, making the industry the nation's second largest waste producer behind agriculture, according to the U.S. Environmental Protection Agency.
- A 1988 University of California study, commissioned by the Legislature, documented a wide range of mining problems in California, from acidic mine wastes spilling into streams near Redding to asbestos fibers swirling in an aqueduct serving 12 million Southern California residents.

"Despite its importance to the economy," the report said, "mining has caused tremendous environmental problems and it has posed potential threats to public health."

But the mining industry says its environmental record is improving.

"At one time, yes, it was common practice to discharge tailings into the local creek, just as it was common practice to discharge municipal sewage into the local creek," said Krauss of Homestake Mining Co.

"But society's environmental awareness has increased. And in many respects, the mining community is ahead of other aspects of society in responding to this environmental awareness.

"Mining practices, for example, have changed much more radically and much more readily than, say, sewage disposal," Krauss said.

But Philip Hocker, president of the Mineral Policy Center – a Washington-based group working to reform mineral mining laws – said environmental problems continue to haunt the mining industry.

"It is part of the industry's collective folklore to pretend these things all happened in the dim past and that they're not happening anymore. That's simply not true.

"And besides, the scale of modern mining operations is much greater than in the past. The potential for abuse is even greater today than what has been left to us by these old mining operations."

The 1988 University of California report had this to say: "Many problems are from older, abandoned mines, and in many cases they are the product of outdated mining and processing techniques. Nevertheless, current mining operations continue to pose environmental and public health hazards that warrant serious attention."

The 1872 mining law says nothing about reclamation or environmental protection, but a variety of other federal and state laws do. But in case after case across the West, the laws are just not working.

In California, for example, a state survey of 116 abandoned mine operations in 31 counties last year found that only 11 percent had been reclaimed – in spite of a 1975 state law requiring reclamation. At the unreclaimed sites, "environmental problems were common, including erosion, noxious weeds, illegal dumping and safety hazards," the report said.

"There are laws on the books but they're just not being enforced," said Thomas Kimball, former president of the National Wildlife Federation. "We've got to find ways to make sure that our public servants enforce these laws."

SUNDAY

The Sacramento Bee

© 1990 THE SACRAMENTO BEE
SUNDAY, MARCH 18, 1990
FOUNDED 1857 • VOLUME 267 • $1.0

GOLDEN LAND, SHATTERED EARTH

Government proves to be a lax landlord

By Tom Knudson
Bee Staff Writer

The federal government – the largest landowner in the Western United States – has failed to protect the region from mining scars.

You can see the damage from the Continental Divide of Colorado to the sagebrush sea of Nevada. And while much of the damage was done years ago, mining continues to foul the landscape today – in violation of a 1976 federal law.

Here are a few examples of mining damage in the 1980s, documented in a 1986 report by the General Accounting Office, the investigative arm of Congress.

- In Washoe County, Nev., an old mine site was littered with rusting equipment, a destroyed mobile home, two barrels of sulfuric acid and several sacks of caustic chemicals. Acid from a barrel riddled with bullet holes has drained into the ground.
- Near Carson City, Nev., a 150-foot-long trench was left unreclaimed, posing safety hazards to the public and wildlife.
- Near Elko, Nev., a cyanide-tainted tailings pond was abandoned at an old silver mine. Nearby, an unstable dam had breached, flooding a natural spring.

Looming over the moonscape of abandoned tailing ponds, slag heaps, junk piles and mine dumps is General Mining Law of 1872 – a statute that has been likened to a legislative straitjacket that forces the government to permit mining on public land, no matter the consequences.

■■■

Outside of Questa, N.M., the hard desert wind whips across the tailings pile at Molycorp Inc.'s molybdenum mine, blowing a fine chalky dust and the threat of long-term health problems into the community.

Despite numerous complaints from townspeople, the U.S. Bureau of Land Management recently approved a permit allowing Molycorp to build another tailings pit upwind from Questa.

The BLM's state director, Larry Woodward, said the agency had no choice.

"Although we realize the controversial nature of the tailings disposal facility, the BLM is bound by the General Mining Law of 1872," Woodward told the Taos News.

■■■

Despite the problems, top BLM officials in Washington have expressed little interest in changing the law. On a recent visit to Sacramento, BLM Director Cy Jamison said: "We want to take a real hard look at what (reform) will do to our domestic mining industry.

"The mining industry is in decline – too much of it is going overseas."

John Leshy, a law professor at Arizona State University and the author of "The 1872 Mining Law – A Study in Perpetual Motion," said the statute has long outlived its usefulness.

"In virtually every kind of public land decision-making process, the government looks at different values and tries to balance them," Leshy said in a recent interview.

"Well, the mining law does not allow that. It says mining is always the highest and best use. So, in that sense, it is an anomaly in terms of what modern public land management is all about."

The BLM – which oversees the majority of the public lands in the West – does have the legislative and administrative authority to control some aspects of mining, but its track record is less than vigorous.

"Our regulations really aren't strong enough for us to enforce compliance in a timely fashion – and sometimes not at all," said Tim Carroll, a BLM geologist in California.

One long-standing trouble spot is the BLM's refusal, in most cases, to require miners to post a reclamation bond to make sure their work is cleaned up. The reason: It doesn't want to impose financial hardships on miners, especially small miners.

But often, small miners cause big problems.

"The legacy of the small miner is abandoned equipment, shattered earth and a broken spirit," said Deane Swickard of the BLM office in Folsom. "As long as there's dirt out there and they're digging, it's great. But when they run out of money and they can't clean up the mess, their attitude seems to be, 'Oh, well.'

"The larger companies are reluctant to acknowledge this because they like to keep up a solid front," Swickard added. "They're sort of one fraternity.

"But the damage to the land, the damage to the industry is much greater than the benefits that come from the small miners rooting around for an ounce of gold."

In Nevada, BLM geologist Vic Dunn said: "Most of the problems cited by the GAO were created by – and I'm not sure what term to use – but they weren't honorable mining operations. They just up and disappear on you."

Since 1986, two GAO reports have criticized the BLM for failing to protect Western land from mining damage.

Dunn feels the criticism is unnecessarily harsh. "I think the reading public needs to look at some of the congressmen pushing these GAO reports. I think it's pretty obvious they have an agenda," he said.

But Swickard said his agency deserves the criticism. "Our response to the GAO seems to be, 'Oh, that can't be true. It's all lies. The data is wacky,' all the normal dodges," he said. "But the fact is we do have serious problems.

"The fact is our regulations do not permit individuals to be held accountable," Swickard said. "We're a very tolerant agency. Why should the public have to pay to repair their lands that are damaged by identifiable individuals?"

Another chronic problem is lack of manpower. In Dunn's district alone, four geologists oversee more than 900 mining operations scattered across a region nearly twice the size of New Jersey.

Concerned about the BLM's environmental record, Congress passed a law in 1976 – the Federal Land Policy Management Act – instructing the agency to prevent "undue and unnecessary degradation" to public land.

But the agency's record of putting the law to work is far from impressive.

"From the beginning," said Carroll, "we were coached in a way that basically said, 'Try your best to get some compliance, but if you can't, well, at least you tried. Give the miner the benefit of the doubt.'"

GLOSSARY

ACID MINE DRAINAGE:
Refers to the mixture of acidic water and heavy metals generated by many hardrock mines. The process begins when water and air come in contact with the sulfide-bearing mineral, iron pyrite – more commonly known as fool's gold. The sulfuric acid that is formed strips heavy metals from other minerals associated with the pyrite. In many cases, acid mine drainage is nearly impossible to stop once it begins.

CADMIUM:
Associated with lead, zinc and copper ores, cadmium is considered one of the most hazardous of heavy metals because it is a powerful poison and accumulates in the body over a lifetime. Cadmium can cause high blood pressure, heart disease, bone deformity and cancer.

HARD-ROCK MINING:
A generic term referring to the mining of various metals – including gold, silver, copper, lead and zinc. The term is used to distinguish hard-rock minerals from non-metallics such as asbestos and coal.

HEAP-LEACH:
Generally used to describe a kind of mining in which giant mounds of low-grade ore are leached with a weak solution of cyanide to yield sparkling bars of gold. Miners have known of cyanide's peculiar power to leach gold for years, but only recently has the technology been developed to put the process to work on the vast beds of low-grade ore in the West.

HEAVY METALS:
This family of elements includes iron, zinc, nickel, copper, cadmium, arsenic and mercury. In their natural form, locked up inside the Earth, these elements pose little danger. But when ore is mined, tailings and waste rock containing heavy metals are left behind. These metals can leach into the environment, sometimes years after a mine closes. Most metals are essential to life in tiny amounts but harmful at higher levels.

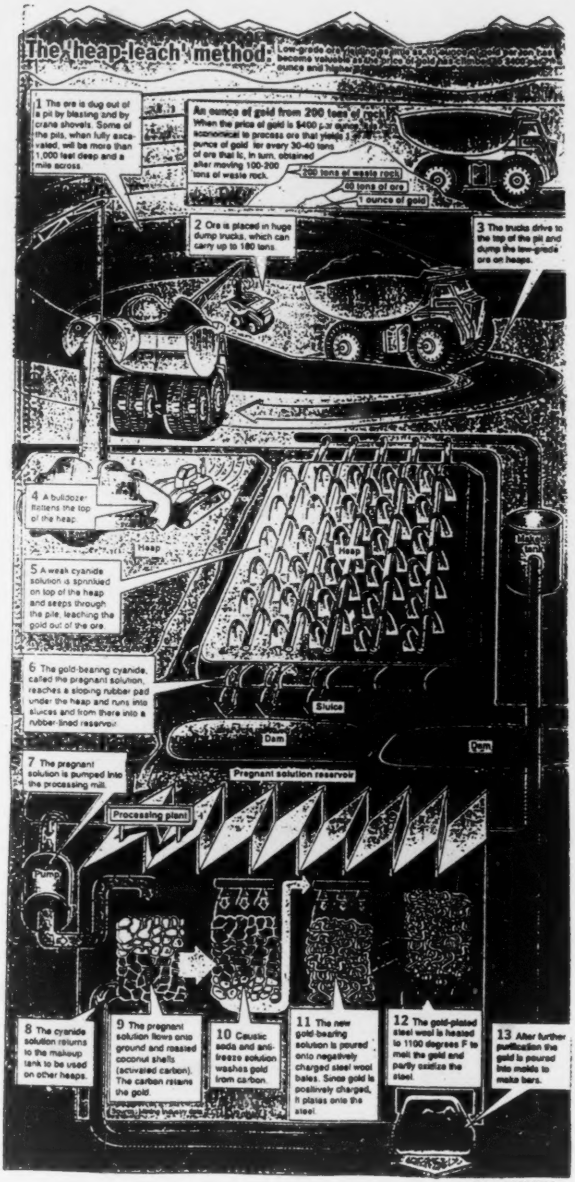
MINING CLAIM:
A block of federal land, generally 20 acres in size, on which a claimant has exclusive rights to develop minerals.

TAILINGS:
Refers to the rock powder that remains after gold and other metals are removed from finely ground ore. Tailings are stored in impoundment areas known as tailings ponds.

WASTE ROCK:
Sometimes called overburden, waste rock is the surplus material that a mine blasts or tunnels through to reach metal-bearing ore.

GOLDEN LAND, SHATTERED EARTH

The Sacramento Bee • Sunday, March 18, 1990



The 'heap-leach' method:

Low-grade ore yielding as little as .01 ounce of gold per ton has become valuable as the price of gold has climbed to $400 per ounce and higher.

1 The ore is dug out of a pit by blasting and by crane shovels. Some of the pits, when fully excavated, will be more than 1,000 feet deep and a mile across.

An ounce of gold from 200 tons of rock
When the price of gold is $400 per ounce, it is economical to process ore that yields 1 [illegible] ounce of gold for every 30-40 tons of ore that is, in turn, obtained after moving 100-200 tons of waste rock.

2 Ore is placed in huge dump trucks, which can carry up to 180 tons.

3 The trucks drive to the top of the pit and dump the low-grade ore on heaps.

4 A bulldozer flattens the top of the heap.

5 A weak cyanide solution is sprinkled on top of the heap and seeps through the pile, leaching the gold out of the ore.

6 The gold-bearing cyanide, called the pregnant solution, reaches a sloping rubber pad under the heap and runs into sluices and from there into a rubber-lined reservoir.

7 The pregnant solution is pumped into the processing mill.

8 The cyanide solution returns to the makeup tank to be used on other heaps.

9 The pregnant solution flows onto ground and roasted coconut shells (activated carbon). The carbon retains the gold.

10 Caustic soda and anti-freeze solution washes gold from carbon.

11 The new gold-bearing solution is poured onto negatively charged steel wool bales. Since gold is positively charged, it plates onto the steel.

12 The gold-plated steel wool is heated to 1100 degrees F to melt the gold and partly oxidize the steel.

13 After further purification the gold is poured into molds to make bars.

Source: Mining industry data

Bee graphic/Mitchell Bro

The Sacramento Bee

MONDAY, MARCH 19, 1990

FOUNDED 1857 • VOLUME 267 • 35¢

© 1990 THE SACRAMENTO BEE

GOLDEN LAND, SHATTERED EARTH

'Mines' yield more garbage than gold

Second of five parts

By Tom Knudson
Bee Staff Writer

WEST POINT, Calaveras Co – The road winds gently through the Sierra Nevada foothills, past small farms and country homes and comes to a stop at one of the many small gold mines in the region.

But you will find no gleaming pile of ore here, not even a miner. You will find, however, enough debris to start a small landfill – an unsightly stockpile of junked cars, rusty mining equipment, trashed-out trailers and other rubble.

"It's disgusting," said Danny Gryder, a nearby resident. "This is public land and it shouldn't be treated like this. What if all our government land looked like this? We'd be nothing but a junkyard."

The situation is not unusual. Across the West, thousands of acres of federal land set aside for mining are being routinely abused – by miners and non-miners alike. And to make matters worse, much of the abuse is taking place under the authority of the nation's pre-eminent mining statute: the General Mining Law of 1872.

You name it and you can probably find it on a mining claim, including mountains of garbage, recreational cabins, boats, private homes, forests of marijuana, burned-out trailers – anything, it seems, but a miner. If you are especially unlucky, you might also find a gun in your face.

The problems are particularly out of control in the Sierra Nevada foothills above Sacramento, the very region made famous by the California gold rush of 1849. "Out of the 10,000 or so claims we administer, I might see five to 10 that are commercially active," said Deane Swickard, who oversees the region for the U.S. Bureau of Land Management.

"And I see hundreds with all kinds of abuses and problems associated with them from little nuisance kinds of things to – on the other end of the scale – homicide. We've had probably a dozen homicides over the past six years, mostly related to mining and mining claims. And I'm outraged by that."

Even Congress wants to know more. Recently, the General Accounting Office – the investigative arm of Congress – made a swing through the West, gathering information on mining claim abuses. A report is expected this spring.

Many federal land managers are working hard to end the abuses. But often their efforts are thwarted by a thicket of legal and administrative problems – everything from a shortage of manpower to the 1872 mining law itself, which critics say invites fraud and manipulation.

"The law makes it so easy to stake claims that it has basically invited a lot of scoundrels to file a lot of claims," said John Leshy, an Arizona State University law professor and the author of a recent book on the 1872 mining law.

Today, even the mining industry is calling for stronger action.

"This kind of thing gives mining a bad name," said Arzell Hale, president of the California Mining Association. "It's a nuisance to the good, credible mining companies. We need to get together with the BLM and try to clean it up."

■■■

Bee/Jay Mather

Calaveras County resident Danny Gryder is one of many in the foothills who are upset about miners on public land who trash an area and then move on.

Near the north fork of the Mokelumne River, BLM geologist Tim Carroll pulls his truck off the road and steps out to inspect a small gold mine on public land.

But like many mines in the Sierra Nevada foothills, this one is producing more garbage than gold. In one sprawling pile, there are old tires, an engine block, rusty barrels, plastic buckets, car batteries, hunks of plywood, a beer keg and an old snowmobile.

"Look at that," said Carroll, peering into the mess. "There's even a kitchen sink.

"This guy seems to have the same mentality that most of our mining claim operators have," he said. "And that is: Let's develop a junkyard."

■■■

Step into your car in Denver and head west, over the snow-shrouded Rockies, past the shimmering salt flats of Utah, across the barren outback of Nevada and over the Sierra Nevada into California.

The odds are good that at any point on this long journey, you will not be far from a mining claim.

Rooted in the customs of the early gold rush days and incorporated into the 1872 mining law, the right to roam across public land and stake a claim to promising mineral deposits remains a cornerstone of hard-rock mining today.

Over the years, in fact, this so-called right of free access has hardened into legend – a principle that miners say embodies the very spirit of America. It is free enterprise, initiative and opportunity, all wrapped up into a giant, patriotic treasure hunt.

In the words of Colorado miner John Schumacher: "The American dream is still going strong – thanks to the individual initiative provided by the 1872 mining law."

But there is a dark shadow in this bright world of opportunity, one that is seldom discussed or publicized. It is a shadow of mining law abuse and needless environmental damage – and it is falling mostly across the small-time mining operations, according to federal, state and university officials.

"The problem is often not with the big companies," said former U.S. Secretary of the Interior Stewart Udall. "It's with the fly-by-night operators, some of whom are still trying to stake claims for non-mining purposes."

■■■

Stretching from the Mexico border north to the Owens Valley, the California desert is a hauntingly beautiful tapestry of public land – and the focus of a bitter debate between development and conservation.

But while the controversy rages, many already have claimed the desert as their own – under the guise of mining.

"These people really have no intent to explore for minerals," said Gerald Hillier, district manager for the BLM's California Desert District, which covers 12.5 million acres scattered across the southern quarter of the state. "They're just looking for a place to put their shack.

"Very often they know enough that they've got some kind of discovery hole. Sometimes it's nothing more than a pit where they dump their gray water and garbage.

"They're using the 1872 mining law as a subterfuge. And in essence what they are doing is stealing the public land."

■■■

But to miners, the 1872 mining law – written to spur development of the nation's mineral resources – is an engine of mineral discovery that has kept America strong for more than a century. As evidence, they point to a treasure chest of minerals discovered on public land: molybdenum in Alaska, borate in California, silver in Colorado, gold in Nevada, uranium in New Mexico and so on.

In fact, miners say that if Congress tinkers with the 118-year-old law – two reform bills are pending before Congress – the United States could be in danger.

"The U.S. government would be dependent upon and subject to the foibles of, and price-gouging by, foreign sources of many essential minerals," said Robert Sanregret, spokesman for the Western Mining Council, in testimony before Congress last year.

The problems are taking place on what are called "unpatented" mining claims – land owned by the U.S. government but on which claim holders have exclusive rights to develop minerals.

To stake a claim, you need only some rudimentary markers – PVC pipe will do, or even a mound of rocks – and $20 in filing fees, $10 for the United States and $10 for the county. Mining claims can vary in size, but most are about 20 acres. There is no limit on how many claims an individual can control. And to make things even easier, you don't need to find minerals to stake a claim but only say you are looking for them.

"Many of these things are just paper claims," BLM geologist Carroll said. "People are hoping some big company will find something nearby and buy them out. They're not mining; they're speculating."

But even though speculation inhibits genuine mineral exploration, it is often the least of the problems faced by land managers.

"Probably the thing that bothers me most is when you've got mining claims adjacent to or intermixed with private property," Swickard said.

"The people living on private property pay their taxes and abide by building codes. But next door, there's somebody living in a shack, on a mining claim, under unsanitary conditions, not meeting building codes and creating a fire hazard.

"In some areas, I know people who've had to increase their fire insurance and get guns to deal with this kind of threat."

The problem of illegal occupancy on mining claims has been around for a long time. But today, "the incidence seems to be increasing, perhaps as more people seek alternate or second homesites outside urban areas," Hillier of the BLM's California Desert District said in a 1988 letter to Rep. Mel Levine, D-Santa Monica.

"It's gotten to the point where you almost don't want to go out in the field anymore," said Kay Miller, a BLM real estate specialist, "because if you've got two claims to investigate, you'll come back with four more you need to look at."

"What people are doing," Swickard said, "is staking claims without ever finding any minerals, for recreation, occupation or whatever they want to do – knowing it will take the BLM a while to get around to kicking them out.

"In the meantime, they have no taxes, no rent – it's free living. And if you're down on a river, or next to a creek, well, that's not bad."

■■■

Perched on a ridge above the middle fork of the Mokelumne River southeast of Sacramento, William Doherty's cabin looks like just another idyllic country getaway.

But there is something about the cabin that sets it apart from others: It sits on a mining claim.

"What that cabin is used for is hunting and fishing," Swickard said. "The pattern of use occurs on the weekends and correlates with the hunting and fishing season."

Since 1973, the BLM has tried to remove Doherty from the cabin through administrative procedures under the U.S. Department of Interior. But Doherty – owner of an electronics manufacturing firm in Sutter Creek – is fighting the agency. Doherty says he is a miner.

The place doesn't look much like a mine, though. On a recent tour, no mining activity was observed. Just downhill from the cabin, however, you could see a small excavation –

about the size of a bridge toll booth – that Doherty claims is a potential gold mine.

"You can see that all they've got here is a wheelbarrow," Carroll said. On an earlier visit to the site, Carroll noticed another piece of equipment in the driveway: a rowboat.

But according to documents filed last year by Doherty's lawyer, Guy Reynolds, the cabin is not used for recreation: "There is no question that the cabin is used for mining purposes only."

Doherty himself was reluctant to discuss the case. "I really don't want to get too involved because this is under appeal," he said.

But in court documents, he has acknowledged his mining operation is marginal, saying he has extracted only two or three ounces of gold since 1974. Under federal mining law, however, that apparently is enough.

"Some legitimate mining activity is being conducted on an ongoing, if sporadic, basis," wrote Interior Department Administrative Law Judge Harvey Sweitzer in a decision approving Doherty's occupancy. The BLM has appealed the decision.

And what about the rowboat?

"There's no rowboat up there," Doherty said. "There might have been at one time. Somebody may have dropped it off or something."

"You can see the futility we experience," Swickard said. "The system is so steeped in the tradition of mining that anything that passes for even the smallest amount of mining is considered sacrosanct."

To compound the problem, the BLM's system of settling disputes is riddled with clumsy legal and administrative standards – a Rube Goldberg style of enforcement that helps no one, according to critics.

To kick someone off a mining claim, the agency must determine that they are not using "due diligence" in pursuing a deposit and that their cabin is not "reasonably incident" to mining activities.

Such judgments are hardly clear cut, and a legal appeal can tie the process up for years – all the while safeguarding the claim holder's occupancy. "It's just an impossible situation," said Swickard. "It just invites abuse."

And to top it off, there is another problem: Not enough money or manpower. "Our office has only two full-time employees to deal with 10,000 claims," Swickard said.

"If we worked 365 days a year, well, you figure it out. It's going to be a while before we get around to looking at all these claims."

The problem of illegal occupancy, however frustrating, is but one thread in a long skein of abuse. Another sore spot is the requirement that each claim holder perform $100 worth of mineral development work a year.

"In my opinion, in 80 to 90 percent of the claims we deal with, there is no assessment work being done," Swickard said. "But it is reported as being done. It's fraudulent."

Asked why the BLM doesn't do something about it, Swickard replied: "How? I would have to investigate each of these and prove they didn't do their work.

"And if we go through that process, they can just go back and file another claim on the same spot. And I'm right back where I started."

Even when the work is done, it often has nothing to do with mining. "The classic thing is to take a backhoe and cut a trench," Swickard said.

"All that does is unnecessarily damage the public land. In the worst case, there are some pretty dangerous situations out there. There might be some 15-foot-deep holes, eight-feet long with straight walls. It'll gobble up children, animals or anything else."

The BLM's record of dealing with the abuses, especially those caused by small miners, is exceedingly poor, a problem Swickard belives is rooted in politics and the agency's historic pro-mining tilt.

But change may be in the wind. Last month, the BLM announced a proposal to do away with the $100 work requirement in favor of a $100 annual payment – a plan designed to reduce mining claim abuse and raise up to $97.5 million for the government.

"You have a different administration with a different bent," said Carol MacDonald, a BLM public affairs specialist in Washington.

"We recognize that we have been criticized," she said. "So maybe it is time to look at what we're doing."

For agents in the field, the changes cannot come to soon.

"We seem to have accepted the idea institutionally that anyone who says they are a miner is a miner – and that if it's mining it can't be bad," Swickard said.

"That's nice for defending everything miners may do on public land. But to allow these kind of abuses and write them off as nostalgia doesn't make any sense."

Not long ago, Swickard took his message to the executive board of the California Mining Association.

"We had a nice dinner and everyone was laughing and having a good time. And then I stood up and told them, 'I enjoyed eating your meal but I'm here to tell you your public image stinks.'

"I had a slide presentation and I said, 'Let me show you the corporate headquarters of the mining companies I deal with.' And I showed them pictures of every trash-bag operation around. And it really hit home.

"You know what their response was? They said, 'You're right. Why aren't you doing something? Why doesn't the BLM accept its responsibilities and regulate more aggressively? Why don't you introduce a new mining law that does something about these abuses – and still lets us mine?' "

FINAL

The Sacramento Bee

© 1990 THE SACRAMENTO BEE · MONDAY, MARCH 19, 1990 · FOUNDED 1857 • VOLUME 267 • 35¢

GOLDEN LAND, SHATTERED EARTH

Gunfire—and murder—at mines not uncommon

By Tom Knudson
Bee Staff Writer

MOUNTAIN RANCH, Calaveras Co. – Out near a place called Salamander Creek, two miners, Allen Bradberry and Joseph Folsom, were locked in a bitter quarrel over a mining claim. There was a scuffle for a pistol and suddenly the sound of gunfire thundered through the hills.

Bradberry fell to the ground, a bullet through his heart, his life over at age 38.

The incident, which may seem lifted from the Wild West novels of Zane Grey or Louis L'Amour, took place Jan. 30, jarring the serenity of this quiet foothill community.

To federal land managers, such incidents are not unusual: At least a dozen mining-related murders have been committed in the Sierra Nevada foothills near Sacramento in recent years, according to Deane Swickard, who patrols the region for the U.S. Bureau of Land Management.

"You've got to be real careful," said Steve Smith, a BLM resource protection chief who oversees a large chunk of the California desert. "You never know who you're going to come across. Some of these people really aren't rational."

The most notable example of that was a wild-eyed drifter who took up residence on a mining claim on public land in the California desert in the 1960s, along with a group of followers. The drifter's name was Charles Manson.

"The trouble is that the mining law colors the title to the land so that people get the impression they can move onto the public land and live there," Swickard said recently.

"They're living like it's the Old West. Normally they're armed. They tend to be antisocial. And they feel they've got to defend their 'property' against any perceived threat."

Even the BLM must take precautions. "We've actually had to take county SWAT teams with us to secure areas so we can deal with these characters," Swickard said.

"People are being blown away because we are allowing people who aren't mining to live on mining claims," Swickard said. "Granted, it's not happening every day. But I think a dozen or more lives lost in six years requires more than a yawn."

In the Mountain Ranch case, Bradberry and Folsom apparently were quarreling over an access road to a mining claim, Swickard said.

Voluntary manslaughter charges were dismissed against Folsom last month after a Calaveras County sheriff's investigation ruled he acted in self-defense.

A sheriff's office spokesman said Folsom, 63, told investigators Bradberry lunged for Folsom's gun during an argument. When Bradberry failed to gain control of the gun but continued to advance, Folsom shot him. The spokesman said Folsom's account was confirmed by a polygraph examination.

The spokesman also said Bradberry was reported to have "a reputation for drawing guns and knives and was convicted of brandishing a firearm in April 1989."

FINAL

The Sacramento Bee

© 1990 THE SACRAMENTO BEE TUESDAY, MARCH 20, 1990 FOUNDED 1857 • VOLUME 267 • 3

GOLDEN LAND, SHATTERED EARTH

Foreign firms mine U.S. gold — for nothing

Third of five parts

By Tom Knudson
Bee Staff Writer

ROUND MOUNTAIN, Nev. – For the right to mine gold in Canada's Northwest Territories, the Echo Bay Mining Co. pays the Canadian government a royalty of up to $2 million a year.

But here in central Nevada – where it operates one of North America's largest gold mines – the Canadian-owned company pays not a dime in royalties to the United States.

Echo Bay is not unique.

Unknown to most Americans, the United States does not charge a royalty for hard-rock minerals on public land – a privilege rooted in the frontier spirit of the General Mining Law of 1872, which sought to lure settlers westward with the promise of free access to the nation's mineral wealth.

But today, as the biggest, richest gold mining boom in U.S. history sweeps across the West, that 19th century policy is costing the nation dearly. Nevada alone has 75 million ounces of gold in the ground, worth $30 billion at today's prices – most of it on public land and all of it free from federal royalties.

And what's more, millions of ounces of American gold are being mined by foreign companies. Sixteen of the top 25 gold mines in the United States are owned in whole or in part by Canadian, British and Australian companies, according to federal and industry data.

And much of that gold is being bought by Japanese investors. Industry sources said Japanese and Taiwanese investment in gold has jumped dramatically in the late 1980s.

No one knows precisely how much the United States loses by not charging a royalty for hard-rock minerals. But based on official estimates of mineral reserves, the figure easily runs into the billions.

"Over the next five years, more than $10 billion worth of gold that you and I own is going to pass into private hands in the state of Nevada alone," said Philip Hocker, president of the Mineral Policy Center, a Washington-based group working to reform the 1872 mining law. "And I think the public has a right to expect a fair return for that."

For years, the issue has languished in a kind of bureaucratic backwater – not well-known even to those who oversee federal land policy. But today the subject has been thrust into the political and economic spotlight by Sen. Dale Bumpers, D-Ark.

Concerned about what he calls a free lunch for mining companies and a drain on the federal treasury, Bumpers has introduced legislation that would set an 8 percent royalty on hard-rock minerals – such as gold, silver and copper – mined on U.S. soil.

"Times have changed since that great westward migration, yet the 1872 mining law remains," Bumpers said. "I believe the law must be changed."

But the bill faces fierce opposition from miners. A royalty, they say, would stifle gold production. And besides, they add, mining companies already pay millions of dollars in federal, state and county taxes.

"It's an added cost," said Llee Chapman, accounting manager for Gold Fields Mining Corp., a British-owned gold mining company in north-central Nevada. "We're like any businessman. You try not to absorb an added cost, if you can help it."

But others say the hard-rock mining industry, which routinely pays royalty and rental fees on private and state property, is asking for special treatment.

"If you give a kid candy every day, pretty soon he starts to think he has to have candy to live," Hocker said. "The hard-rock mining industry has been living off a public candy handout for 118 years."

■■■

At its Black Thunder mine in northeast Wyoming, the Atlantic Richfield Co. mines about 30 million tons of coal a year from federal land. Unlike gold, coal carries a federal royalty of 12.5 percent. At Black Thunder – the nation's largest coal mine – the figures add up fast. Last year, Black Thunder coal brought the U.S. Treasury roughly $82,000 a day – about $30 million for the year.

At its Chimney Creek mine, Gold Fields extracts about 200,000 ounces of gold a year – worth about $80 million – from a 65-square-mile parcel of public land. The federal royalty on that gold: zero.

■■■

The pace of the modern-day gold boom is phenomenal. Since 1984, domestic production of gold has more than quadrupled, going from 2.1 million ounces to 8.6 million ounces in 1989, according to industry and government figures.

Even history is being rewritten. Today's boom, for example, is far richer than even the fabled California gold rush, which – until recently – was considered the nation's largest.

Domestic production in 1990 is expected to exceed 9.4 million ounces, more than double the 3.9 million ounces produced during the peak year of the California rush, 1852. And unlike previous booms, today's gold rush has unusual staying power. There is enough gold in U.S. soil to keep mines busy well into the 21st century.

The catalyst for the boom: new cyanide-based technology that allows companies to profitably extract microscopic flecks of gold scattered amid tons of ore. The technology is so efficient that gold – worth about $400 an ounce today – can cost as little as $100 an ounce to mine.

The so-called invisible gold – undetected by early prospectors – is being mined across a broad swath of the West, from the Mojave Desert in Southern California to the Rocky Mountains in Montana.

But the center of this modern-day bonanza is Nevada, which last year produced about 5 million ounces of gold – more than half of the nation's total. California was the nation's second biggest gold producer, with 810,512 ounces.

Almost every month brings word of record production at one mine or another. In 1989, Nevada's biggest producer, the Newmont Mining Co. – 49.3 percent British owned – became the first company in the world outside of South Africa to mine more than 1 million ounces of gold in a single year.

Despite such riches, no one has pinpointed how much gold is coming from public land.

"We've been asked that before," said Bob Stewart, a spokesman for the U.S. Bureau of Land Management in Nevada. "We've never put the figures together. But Nevada is 87 percent federal. What we've always said is that 80 to 90 percent of the gold being mined today was discovered on public land."

To royalty proponents, such figures represent a potential gold mine for the federal treasury.

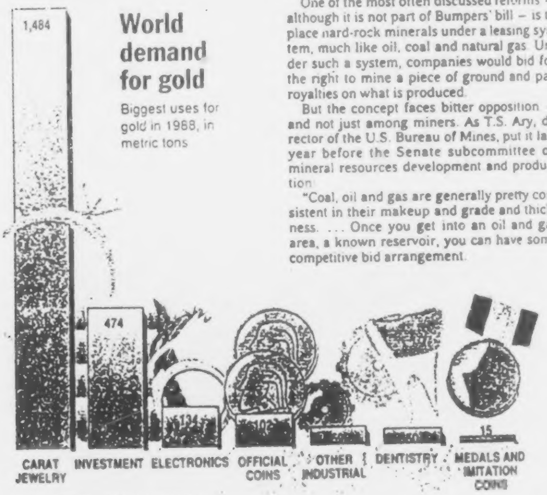
But the mining industry sees things differently. The lack of a federal royalty "is just another in a whole range of incentives to the business community that benefits the public at large," said Ray Krauss, an environmental manager for the Homestake Mining Co. in California.

"You've got tax benefits, depletion allowances, write-off opportunities, import quotas – all kinds of things that affect your bottom line. And look at the subsidies we give our agricultural industry. Certainly the mining industry has never asked for agricultural-type subsidies," Krauss said.

One of the most often discussed reforms – although it is not part of Bumpers' bill – is to place hard-rock minerals under a leasing system, much like oil, coal and natural gas. Under such a system, companies would bid for the right to mine a piece of ground and pay royalties on what is produced.

But the concept faces bitter opposition – and not just among miners. As T.S. Ary, director of the U.S. Bureau of Mines, put it last year before the Senate subcommittee on mineral resources development and production:

"Coal, oil and gas are generally pretty consistent in their makeup and grade and thickness. ... Once you get into an oil and gas area, a known reservoir, you can have some competitive bid arrangement.



World demand for gold

Biggest uses for gold in 1988, in metric tons

Source: Consolidated Gold Fields of London

"On the hard-rock minerals, it is a different story. They are very erratic in nature. They are small generally. The risk you are taking is so much different."

And there's another factor:

"How's the little guy going to compete with the Exxons and Chevrons for a lease? We're already an endangered species and this would just about finish us off."

The words are those of Don Smith, one of Nevada's more well-known prospectors. For more than 25 years, Smith has roamed through sagebrush, cactus and rocky canyons, turning up deposits of gold, silver, turquoise, mercury and barite. Over the years, Smith has done quite well – and he has done it on his own.

"The way it works is you find something that looks promising and then you spend your money to prove there is really something there.

"And then you take it to the big companies. And they might say 'OK, we'll give you $5,000 this year to go in and look and if we find something we'll pay you $10,000 next year.'

"That's how these deals go. Man, I've got stacks of 'em."

■■■

Most mornings you can find Smith at the Owl Club, a casino-bar-hotel-restaurant that is the social center of Battle Mountain, a dusty boom town along Interstate 80 in north-central Nevada. Mention the words lease or royalty and you can almost feel his blood pressure go through the roof.

"You've got to have the initiative and the profit motive," he said. "If you don't have the initiative to get out there, who's going to go?"

"And as far as a royalty goes, well, what did the federal government ever do to help me find this stuff?

■■■

Some 900 miles to the southeast, a quite different man works quietly in his Santa Fe, N.M., office. He is Stewart Udall, former U.S. interior secretary under Presidents John F. Kennedy and Lyndon B. Johnson, and one of the nation's more noted conservationists.

A lawyer and a writer these days, Udall has long called for reform of the 1872 mining law. In fact, one of his last acts before leaving office in 1969 was to write a letter to the Public Land Law Review Commission in which he called mining law reform "the most important piece of business on the nation's natural resource agenda."

"No private landowner would countenance a system whereby he extends a continuing invitation to others, regardless of his own needs, to come onto his land without even notice to him, to search for and take out the minerals, to leave it despoiled and to pay nothing," Udall wrote in the letter. "The time is long since past when the American people can afford such profligacy."

Twenty-one years later, the minerals are still free.

To Udall, the debate casts a long historical shadow. Look at the 1930s, he said, when the passage of the Taylor Grazing Act – which established grazing fees on public land – drew the wrath of Western cattlemen.

"They thought it was outrageous," Udall said. "They said things like, 'We never had to do this before. Why are you imposing this burden on us? We're providing economic development for the country.'

"But after a stern battle, that principle was established. But not so with the mining law."

"We're not against government and we're not against taxation," said Chapman of Gold Fields' Chimney Creek mine. "We just feel there is enough risk in the business already and that the current system works."

He ticked off a list of taxes Gold Fields paid in 1988: $2.6 million to Nevada for a "net proceeds" tax (a new state tax based on the value of gold produced, minus expenses), $450,000 to Humboldt County for property taxes and $710,000 in sales taxes.

"Once you put a mine into production and start to make money, you pay the same taxes everybody else does," Chapman said. "You pay federal income tax. You pay sales taxes and property taxes on your structures, machinery and equipment."

To which Hocker of the Mineral Policy Center replied: "Yes, but that is true of every other enterprise in this country. My heart really bleeds for them that they have to pay federal income taxes. So do I. They are basically still arguing for special treatment."

Although mining companies bitterly oppose royalties on federal land, they routinely pay them on private holdings. A recent mining industry study, for example, found that 34 of 43 gold mines in Nevada pay royalties to individuals and small companies. The average royalty was 4.2 percent of the value of production.

When Newmont Mining Co. purchased the T-Lazy-S Ranch near Carlin, Nev., it agreed to pay its owners – one of whom is Californian Roy Ash – a royalty of 16 percent. The ranch is now the site of the richest gold mine in the United States.

"Roy Ash is a millionaire many, many, many times over from having owned the property we are now mining," said Newmont spokesman Jim Hill.

"We produced 1.45 million ounces of gold last year," Hill said, "and on that, we paid approximately $40 an ounce in royalties."

"It doesn't make any sense," Hocker said. "If a mining company walks up and finds a valuable ore deposit on your land, they expect to sit down and negotiate a payment. But if they find that same ore deposit on public land, they expect to get it for free."

Opponents of a federal royalty say it would cause economic turmoil in the mining industry. As Sen. James McClure, R-Idaho, put it:

"To impose royalties on hard-rock mining operations, most of which are economically marginal, would merely shift a large block of those operations into the submarginal category."

But judging from industry figures, large gold producers would not suffer much. According to the International Gold Mining Newsletter, the average cost to produce an ounce of gold in the United States in 1988 was $223. The average gold price that year was $438 per ounce.

And profits have been strong. During the last half of 1988, profits at British-owned Gold Fields Mining jumped 52 percent "mainly due to full production from Chimney Creek in Nevada," the International Gold Mining Newsletter reported.

"I don't buy the argument that the whole industry would dry up," said Chapman at the Chimney Creek mine. "It's true that a royalty could make certain ore bodies uneconomical. But with others, it would just be an added cost of doing business."

In fact, mining's rock-hard resistance to a federal royalty could be crumbling. David Delcour, vice president of Amax Mineral Resources Co., suggested at last year's Senate hearing that a federal royalty might be acceptable, but he balked at Bumpers' proposed figure of 8 percent of gross income.

"Possibly we can come up with one," said Delcour, chairman of the Public Lands Committee of the American Mining Congress. "You ought to pursue it on the basis of some type of net (income) and it ought to be somehow representative of the types of royalties available in the private sector."

Another issue that has drawn the concern of state officials and even miners is the shape of the U.S. gold industry – now heavy with Canadian and British money.

In Nevada, 16 of the top 25 gold producers – the source of 97 percent of the state's gold – are owned in whole or in part by Canadian and British companies, according to a 1988 directory of mines compiled by the Nevada Department of Minerals. Those 16 operations, including Newmont (49.3 percent British) and Round Mountain (50 percent Canadian), produced just over 2.2 million ounces of gold in Nevada in 1988, about 59 percent of the state's total.

"These are public lands and they do belong to the people of the U.S.," said Doug Kari, a Los Angeles-based attorney involved in mining issues. "I believe these big Canadian firms ought to be paying something back to the U.S. Treasury. Certainly, they are exploiting value out of our land."

A spokesman for Echo Bay, the Canadian gold mining company that pays royalties in Canada but not in the United States, was reluctant to respond to questions.

"Echo Bay does not favor a change in the mining law," the spokesman said. Asked to elaborate, the spokesman would only repeat his original statement: "Echo Bay does not favor a change in the mining law."

GLOSSARY

HARD-ROCK MINING:
A generic term referring to the mining of various metals — including gold, silver, copper, lead and zinc. The term is used to distinguish hard-rock minerals from non-metallics such as asbestos and coal.

HEAP-LEACH:
Generally used to describe a kind of mining in which giant mounds of low-grade ore are leached with a weak solution of cyanide to yield sparkling bars of gold. Miners have known of cyanide's peculiar power to leach gold for years, but only recently has the technology been developed to put the process to work on the vast beds of low-grade ore in the West.

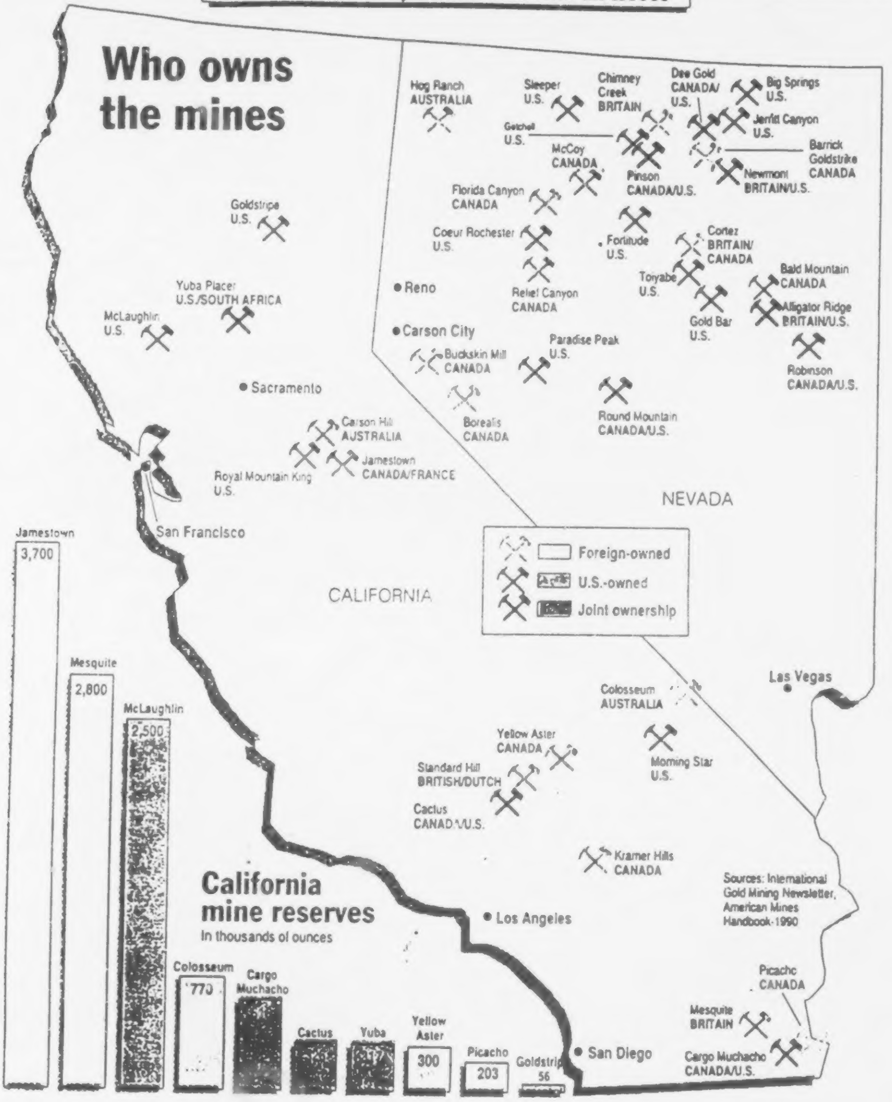
HEAVY METALS:
This family of elements includes iron, zinc, nickel, copper, cadmium, arsenic and mercury. In their natural form, locked up inside the Earth, these elements pose little danger. But when ore is mined, tailings and waste rock containing heavy metals are left behind. These metals can leach into the environment, sometimes years after a mine closes. Most metals are essential to life in tiny amounts but harmful at higher levels.

MINING CLAIM:
A block of federal land, generally 20 acres in size, on which a claimant has exclusive rights to develop minerals.

TAILINGS:
Refers to the rock powder that remains after gold and other metals are removed from finely ground ore. Tailings are stored in impoundment areas known as tailings ponds.

WASTE ROCK:
Sometimes called overburden, waste rock is the surplus material that a mine blasts or tunnels through to reach metal-bearing ore.

GOLDEN LAND, SHATTERED EARTH



Who owns the mines

California mine reserves
In thousands of ounces

Sources: International Gold Mining Newsletter, American Mines Handbook-1990

Foreign-owned
U.S.-owned
Joint ownership
CALIFORNIA
NEVADA
Reno
Carson City
Sacramento
San Francisco
Los Angeles
San Diego
Las Vegas
Hog Ranch AUSTRALIA
Sleeper U.S.
Chimney Creek BRITAIN
Dee Gold CANADA/U.S.
Big Springs U.S.
Jerritt Canyon U.S.
Getchell U.S.
McCoy CANADA
Pinson CANADA/U.S.
Barrick Goldstrike CANADA
Newmont BRITAIN/U.S.
Florida Canyon CANADA
Coeur Rochester U.S.
Fortitude U.S.
Cortez BRITAIN/CANADA
Relief Canyon CANADA
Toiyabe U.S.
Bald Mountain CANADA
Alligator Ridge BRITAIN/U.S.
Gold Bar U.S.
Robinson CANADA/U.S.
Paradise Peak U.S.
Buckskin Mill CANADA
Borealis CANADA
Round Mountain CANADA/U.S.
Goldstripe U.S.
Yuba Placer U.S./SOUTH AFRICA
McLaughlin U.S.
Carson Hill AUSTRALIA
Jamestown CANADA/FRANCE
Royal Mountain King U.S.
Colosseum AUSTRALIA
Yellow Aster CANADA
Morning Star U.S.
Standard Hill BRITISH/DUTCH
Cactus CANADA/U.S.
Kramer Hills CANADA
Picacho CANADA
Mesquite BRITAIN
Cargo Muchacho CANADA/U.S.
Jamestown 3,700
Mesquite 2,800
McLaughlin 2,500
Colosseum 770
Cargo Muchacho
Cactus
Yuba
Yellow Aster 300
Picacho 203
Goldstrip 56

FINAL

The Sacramento Bee

© 1990 THE SACRAMENTO BEE

WEDNESDAY, MARCH 21, 1990

FOUNDED 1857 • VOLUME 267 • 35¢

GOLDEN LAND, SHATTERED EARTH

Mining's grim ecology of pollution, poison

By Tom Knudson
Bee Staff Writer

ANACONDA, Mont. – To most Americans, Montana represents the best of the West – an outdoor citadel filled with rugged mountains, fast-moving rivers and wide-open spaces.

But here along the Clark Fork River, a few hours north of Yellowstone National Park, you will find a much different Montana – one not featured in promotional brochures or outdoor guidebooks.

Here in the heart of Big Sky country is the nation's largest Superfund hazardous waste site – a 120-mile stretch of river ruined by the very industry that settled this part of the state: mining.

The river valley is a moonscape of mining pollution – scarred by tailings ponds, mounds of waste rock, furnace slag and flue dust, all left over from a century of copper mining.

But the visual scars are the least of the problem. Almost every summer, thunderstorms bring a rain of death to the Clark Fork, flushing tons of heavy metals and mine poisons into the river.

"It was terrible," said Herbert Avrutis, a retired physician from Butte who watched mine poisons pour into the river last July after a sudden rainstorm, turning the water red. "We counted several hundred dead fish in just half a mile," he said. "Some were half-dead and half-alive. You could see them coming up to the surface, belly up, gasping for breath. But there were very few of those. Most were dead."

The grim ecology here is not unusual. From Montana to California, some of the grandest corners of the West are being destroyed by pollution

See GOLDEN LAND, page A8

Continued from page A1

from mines, mills and smelters – some of which closed down generations ago but continue to cast a toxic shadow across the landscape.

Today, this landscape of dying fish, denuded hillsides and poisoned rivers poses one of the toughest environmental challenges in the West. Unlike New York's Love Canal, the pollution is spread over hundreds of square miles – in remote canyons and on rugged mountains. In some cases, cleaning it up may be nearly impossible.

"You would have to rip up some of these streams down to bedrock," said Ed Gensler, an abandoned mine specialist with the Montana Department of State Lands. "I can't begin to imagine how to deal with it."

The inventory of problems is long. Here are just a few examples:

- In California, wastes from the Iron Mountain Mine deliver an average daily dose of 4,800 pounds of iron, 1,466 pounds of zinc, 423 pounds of copper and 10 pounds of cadmium into the Keswick Reservoir on the Sacramento River, the source of drinking water for Redding. But sometimes the pollution is 10 times that high.

Cadmium – an insidious poison that accumulates in the kidney, liver and blood vessels over a lifetime and can cause cancer – is a "definite public heath concern," said James Pedri, an engineer for the Central Valley Regional Water Quality Control Board.

Nearby, the Spring Creek reservoir is so fouled by mine wastes that its water is nearly as acidic as lemon juice. "If you put a trout it there, it would die in a few minutes," Pedri said.

- In Colorado, heavy metals and other mine poisons have contaminated about 1,300 miles of streams, tainted large pools of groundwater and killed countless fish. Elevated levels of lead have been found in children in Leadville.
- In Butte, Mont., once the copper capital of the world, mine poisons have so contaminated the landscape that lawns in some areas won't sprout grass and groundwater is hazardous to human health.

Because of the enormous volume of wastes generated, the carelessness with which they were discarded and the difficulty of trying to clean them up, mine-related poisons will haunt the West for generations.

"We'll be dealing with this problem forever – for perpetuity," said Greg Parsons, who oversees a water pollution division for the Colorado Department of Health.

"It's a very big problem and one we have traditionally not had any solutions to."

Yet, the issue has drawn little public attention, in part because the contamination tends to be widely scattered across the largely rural corners of the West.

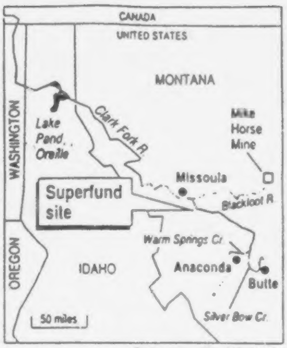
Nonetheless, the poisons are out there, upstream from cities like Denver, Sacramento and Missoula, waiting for the next thunderstorm, heavy snowmelt or earthquake. Former Colorado Gov. Richard Lamm has called the problem "one of the undertold stories in America."

■ ■ ■

Bursting out of the rock walls of Rogers Pass, the Big Blackfoot River is known widely as a trout fisherman's paradise, a river so special that Norman McLean – one of Montana's best-known anglers – wrote a book about it, called "A River Runs Through It."

Today, the Big Blackfoot is a widening environmental calamity, fouled by a cluster of old mines that bleed arsenic, cadmium, zinc, manganese and other poisons into the river.

Among the worst offenders is the Mike Horse Mine, situated near the headwaters of the Big Blackfoot. Mined sporadically for silver, lead and zinc beginning in the late 1880s, the Mike Horse shut down 40 years ago, but its tunnels, tailings and waste rock continue to leach heavy metals into the Big Blackfoot.



Bee graphic/Paul Duginski

"The water literally runs orange out of those shafts," said nearby ranch manager Mark Gerlach. "If you pick up a rock from the stream, you can scrape a quarter-inch of iron oxide scum off of it. It's bright orange – almost day-glow orange."

A recent study by a University of Montana professor documented more bad news: Poisons from the Mike Horse and other mines are marching inexorably downstream, a few feet a day, about a mile a year.

"It's important that people realize these problems don't just last five or 10 years," said Gerlach. "It's 40 years later and the Big Blackfoot just gets worse every year."

The transformation of yesterday's mining treasures into today's toxins begins, oddly enough, with iron pyrite – more commonly known as fool's gold.

Found throughout the West, this sulfide-bearing rock poses relatively little threat in its natural state – locked up inside mountains. But when exposed to air and water in old mine workings, iron pyrite unleashes sulfuric acid, also one of the main ingredients in acid rain.

By itself, acid mine water is a substantial threat, upsetting the natural chemistry of mountain watersheds.

But acid mine waste is only the first link in a longer chain of degradation. As the acidic water percolates through old shafts and piles of tailings and waste rock, it also strips heavy metals from rock, creating another batch of toxins.

Today, an array of metallic poisons is washing into lakes, streams and groundwater around the West. The cast of characters includes cadmium, mercury, iron, zinc, copper, manganese, lead, nickel, silver and arsenic.

Together, the acidic water and heavy metals have turned parts of the West into biological deserts. A recent survey of a five-mile section of California Gulch – a heavily polluted tributary of the Arkansas River in the Colorado Rockies – turned up no living organisms except for one worm and two flies.

"We were surprised to find that much," said Elisabeth Evans, a U.S. Environmental Protection Agency project manager in charge of cleanup work at the California Gulch Superfund site.

A 1988 study of mining wastes in California, commissioned by the Legislature, called the toxic brew of acidic wastes and heavy metals "the principal threat posed by mining in California."

"The environmental damage caused by mining wastes at several abandoned mine sites (in California) is massive," the report said. "Water several miles downstream is almost completely devoid of animal and plant life."

Even when aquatic life is found, it often isn't very healthy. In Colorado's Arkansas River, brown trout are so tainted with heavy metals that they live only about three years. Their normal life span is eight to nine years.

Longtime Montana trout fisherman J.E. McGreevey worries that the dying fish and ruined rivers may be a warning. "First it's the fish," he said. "And later, it'll be us."

The impact of mine poisons on human health is not well-documented. But because many heavy metals accumulate in the body over long periods and can cause a host of health problems, the issue is one of growing concern to scientists.

In Leadville, a historic mining town where streams and yards are contaminated with heavy metals, a recent Colorado Department of Health study documented elevated levels of lead in the town's children.

Lead – one of the world's oldest known poisons – has been linked to neurological damage, kidney problems and learning disabilities. But today, there is even greater reason for concern: A growing body of scientific literature suggests lead may cause health problems at much lower levels than previously believed, especially among children.

"The problem with lead is that it's so insidious," Evans said. "You get a dose, but you don't die. What it does is impair your mental development. We could have whole generations of people in our mining towns who are less than what they could be."

California's study of mine wastes, however, concluded that the principal threat is to wildlife, not people. "Many forms of wildlife are highly sensitive to heavy metals or acid, and will be adversely affected by contaminant (levels) considered safe for drinking," it said.

Leadville is only one example. State and federal records contain numerous references to other potential problems:

- At the Hoopa Valley Indian Reservation in Northern California, children were observed a few years ago playing amid old mining wastes containing "significant levels" of cadmium, lead, arsenic, mercury, zinc and copper, EPA documents show. The site was cleaned up in October 1988.
- In Aspen, Colo., children face a "substantial public health risk" from a huge mound of mining wastes just east of town, upon which homes, condominiums and other structures have been built, according to the EPA.
- At Mill Creek, Mont., just outside Anaconda, 30 families were forced to abandon their homes in the late 1980s after the EPA determined that arsenic from a century of copper mining posed serious health threats, particularly to children.

■ ■ ■

Not far from Mill Creek, the Clark Fork River begins its long journey northwestward out of the Rocky Mountains toward Idaho's Lake Pend Oreille, the Columbia River and eventually, the Pacific Ocean.

Fed by such fabled tributaries as the Big Blackfoot, Flathead and Bitterroot, the Clark Fork – by the time it reaches the Idaho border – is easily the state's largest river.

It is also the most polluted.

The problems began more than a century ago when primitive copper smelting techniques in Butte and Anaconda left giant mounds of mining-wastes along Silver Bow Creek and Warm Springs Creek, which meet at the tiny community of Warm Springs to form the Clark Fork.

Although mining techniques gradually improved, the pollution continued. For more than 70 years, the upper Clark Fork was little more than an industrial sewer for the mining industry.

Today, the heavy metals and other pollutants have been swept 120 miles downstream, nearly to Missoula, a long ribbon of mining wastes that will linger for centuries. Cleanup work and environmental monitoring are expected to cost up to $1.5 billion.

But the Anaconda Copper Co., which caused most of the mess, won't have to pay for the cleanup – it went out of business in 1982. Today, the EPA is trying to recover cleanup funds from the Atlantic Richfield Co., which purchased Anaconda. But ARCO is fighting those efforts.

The biggest threat is at Warm Springs, where 19 million cubic yards of mining wastes are backed up behind a series of unstable earthen dikes at the headwaters of the Clark Fork – a situation many fear is a disaster waiting to happen.

"You've got millions of tons of poisons behind those old dams," said Avrutis, the retired Butte physician. "It's a loose cannon. And it's got to be addressed."

Removing the wastes would be an enormous task. Nineteen million cubic yards is enough to fill a convoy of dump trucks, bumper to bumper, from Butte to Miami and back again, said Peter Nielsen, executive director of the Clark Fork Coalition, a Missoula-based conservation group. To date, the EPA has spent more than $20 million on the Clark Fork – mostly for studies – but the poisons remain.

"I wonder whether it's even physically possible," said trout fisherman McGreevey. "The concentration of waste and contamination is so large that moving it would be like trying to build another Panama Canal."

* * *

If there is a bright spot to all of this, it is that modern mining companies, particularly larger firms, are doing a much better job corralling heavy metals and acidic mine waste.

At the Homestake Mining Co.'s McLaughlin gold mine near Clear Lake in Northern California, for example, company officials examined 34 locations before choosing a tailings pile site. They finally selected a site that had low soil permeability, little or no underlying groundwater and a small upstream watershed.

"Tailings are manageable and acid mine drainage is manageable," said the mine's environmental manager, Ray Krauss. "Water quality can be protected and habitat can be restored."

Nonetheless, scores of mines continue to leave a trail of toxic wastes across the West. And while most of the problem comes from older mines, experts warn that modern-day mines pose threats, too.

The 1988 California mine waste study, for example, cautioned that because of the peculiar nature of acid mine waste "active mines that currently comply with waste discharge requirements could well produce acidic mine (wastes) in the future."

"The latency of acid mine (waste) is unique," the report said. Long after a mine has closed, "acid formation may start and gradually migrate down through the tailings area, sometimes only reaching the groundwater years or decades later."

And then there's another problem: Once the pollution starts, it is almost impossible to reverse.

"What accelerates the process is the presence of naturally occurring bacteria," said Mike Hood, an associate professor of mining engineering at the University of California, Berkeley.

"Once the water reaches a certain acidity, the bacteria kick in, accelerating the oxidation, which in turn accelerates the acidification."

All of which adds up to a monumental problem: At one abandoned mine site in Oklahoma, for example, shafts and tunnels are filled with 78,000 acre-feet of acidic water – enough to supply a medium-size city for a year.

In Colorado, several major watersheds are fouled by mining wastes and 300 to 400 miles of streams have been essentially sterilized. "This is the biggest water quality problem we have left to face," said Parsons of the state Department of Health.

"The more we study, the more questions we have," said the EPA's Evans. "The geology of these mining sites is very complex. They're usually huge and often crisscrossed by faults. And that makes cleanup work very difficult."

And although some pollution control techniques have been developed, the science of controlling mine wastes in the West is in its infancy, according to the California mine waste study.

But even if the technology is found, someone will have to pay for it.

"And that's kind of an awesome responsibility," Evans said. "Because we expect many of these old mine sites to keep draining forever and ever and ever."

GLOSSARY

ACID MINE DRAINAGE:
Refers to the mixture of acidic water and heavy metals generated by many hard-rock mines. The process begins when water and air come in contact with the sulfide-bearing mineral, iron pyrite – more commonly known as fool's gold. The sulfuric acid that is formed strips heavy metals from other minerals associated with the pyrite. In many cases, acid mine drainage is nearly impossible to stop once it begins.

HEAVY METALS:
This family of elements includes iron, zinc, nickel, copper, cadmium, arsenic and mercury. In their natural form, locked up inside the Earth, these elements pose little danger. But when ore is mined, tailings and waste rock containing heavy metals are left behind. These metals can leach into the environment, sometimes years after a mine closes.

TAILINGS:
Refers to the rock powder that remains after gold and other metals are removed from finely ground ore. Tailings are stored in impoundment areas known as tailings ponds.

FINAL

The Sacramento Bee

© 1990 THE SACRAMENTO BEE WEDNESDAY, MARCH 21, 1990 FOUNDED 1857 • VOLUME 267 • 35¢

GOLDEN LAND, SHATTERED EARTH

Gold mining's deadly life blood

Modern cyanide process yields hidden riches, powerful poisons

By Tom Knudson
Bee Staff Writer

BATTLE MOUNTAIN, Nev. – High over Nevada, a flock of shorebirds leans into the wind, drawn like a magnet to the marsh-like tailings pond at the McCoy Cove gold mine.

But unfortunately, the pond is no desert oasis.

More than 600 shorebirds perished in the McCoy pond last year – victims of a modern-day environmental calamity sweeping through mining country.

The pond, and many others like it across the West, are contaminated with cyanide, a powerful poison known to most Americans for its grim role in the Jonestown mass deaths and the Tylenol poisonings.

But cyanide also happens to be the lifeblood of the modern gold mining industry. Without cyanide, in fact, there would be no record-setting gold rush in the West today.

Miners long have known of cyanide's peculiar powers – mixed with ore, it separates out metals – but only in recent years has the technology been developed to put cyanide to work on the low-grade ore, a process that is driving today's gold boom.

The process, known as heap-leaching, has a kind of magic to it. Huge mounds of ordinary looking rock, containing only a few hundredths of an ounce of gold per ton (less than a dental filling's worth) are sprayed with a weak solution of sodium cyanide, eventually yielding sparkling bars of gold.

But there is another side to this modern-day alchemy, one that does not glitter.

Cyanide-based gold mining has left a trail of dead birds and poisoned water across a wide swath of the West. And although many mines are doing a better job of controlling cyanide these days, everything from red-tail hawks to rattlesnakes and great-horned owls to sandhill cranes continue to perish in the ponds.

"I was told a year ago that cyanide and bird kills wasn't going to be a problem again," said Glenn Miller, a professor of biochemistry at the University of Nevada at Reno.

"Well, it wasn't taken care of. How many more times can we be expected to trust the industry?"

The problem was in the news again last week when Kennecott Corp. pleaded guilty in Reno to violating federal law in connection with the deaths of more than 1,400 migratory birds in 1986 in a cyanide-tainted tailings pond at its Alligator Ridge gold mine. The case, involving a $40,000 fine and a $50,000 restitution payment, marked the first time in Nevada that a gold mining company has been prosecuted for killing birds.

Miners say that while birds have died, the industry's record is improving.

"All of us have spent thousands and thousands of dollars on this issue," said Jim Arnold, superintendent of the Chimney Creek gold mine in north-central Nevada. "It's a hot issue and we do feel like we are solving the problem."

Wildlife mortalities, however, are but one problem swirling around this newfangled mining. At numerous mines, cyanide also has leaked into groundwater, where it does not break down as quickly as on the surface. And questions remain about what to do with the mountains of tailings and waste rock, which pose the threat of heavy metal pollution.

"You're talking about a large amount of material that has been extracted from deep within the earth," Miller said. "It hasn't stood the test of geological weathering.

"It's not just the cyanide, but the things that are leached out with it, things like arsenic and mercury. That is something I think is going to come back to haunt us in future years."

Today, no one knows how many animals have died, in part because state and federal game agencies can't keep up with the problem. And in Nevada, where a voluntary reporting system is in place, some mines apparently play by their own rules.

"We continue to get reports that mines are killing significant numbers of birds and not telling anybody about it," said Sam Jojola, a special agent for the U.S. Fish and Wildlife Service in Reno. "They're just burying them and telling their employees to keep quiet."

Mining industry figures in Nevada show that over the past four years, more than 6,700 birds and animals have died in the cyanide ponds, including such majestic species as tundra swans, snowy egrets and mountain bluebirds. But Jojola said the actual death toll could be five to 10 times higher.

"It's a situation that requires constant monitoring," Jojola said. "There are so many mines and so little manpower to keep track of them."

■■■

"I remember once we found a dead mule deer. Well, we drug her off and threw her down an old mining shaft so nobody would know about it."

The words are those of a Nevada miner describing how one gold mine handled its cyanide problem. For obvious reasons, he asked that his name not be used.

"It was an unofficial type thing," he said. "The old guy in charge of the project told us if we found any animals laying around to get rid of them because we could get in a lot of trouble.

"I'm sure that's what a lot of the companies are doing. If they can cover something up, they'll cover it up. They're not going to go running up to a state or federal agency and say, 'Look what I found.' "

■■■

Dead wildlife or not, cyanide-based mining is booming across the West. E.I. du Pont de Nemours & Co. of Delaware – a major cyanide manufacturer – reported last year that cyanide consumption in North America jumped 51 percent in one year – from 142 million pounds in 1988 to 215 million in 1989. Gold mining gobbled up 80 percent of that.

But while the use of cyanide has skyrocketed, the ability to protect birds and wildlife has lagged.

"Ten years ago, the industry had a reasonable excuse for not anticipating the impacts of cyanide," said Philip Hocker, president of the Mineral Policy Center, a group working to reform the 1872 mining law.

"But they don't have that excuse anymore. And are we seeing no avian mortalities from cyanide because they've gone in and fixed the problem? That is not the case."

"I can't argue that some companies have acted faster than others," said Arnold. "But I don't know of anyone who is taking animals and burying them and saying 'Let's not report them.' That's a felony and we just don't do that."

While some companies have had problems, others have compiled excellent records.

At the Newmont Gold Co.'s cluster of mines near Carlin, Nev., fewer than 15 birds died last year, state figures show. Newmont – North America's largest gold producer – also donated $125,000 to The Nature Conservancy to help preserve a nearby wetland in 1988.

"I think the situation is changing for the better," said Jojola. "But the problem is not under control – I can assure you that."

When a new mill went into production last June at the Echo Bay Gold Co.'s McCoy mine, officials were confident they would not have a problem with bird mortalities. After all, the tailings area was designed to prevent the buildup of water – a magnet for waterfowl.

"But we had a little more water than we expected," said Meade Stirland, Echo Bay's manager of environmental affairs. "You always run into problems during startup. Plus, it coincided with a storm."

So instead of a dry tailings impoundment, Echo Bay found itself faced with a giant mud flat – just the kind of thing shorebirds love. Hundreds landed – and hundreds died.

The mine made several attempts to detoxify the mud flat, with limited success. Three months and $2.5 million dollars later, Echo Bay found a chemical neutralization plan that worked.

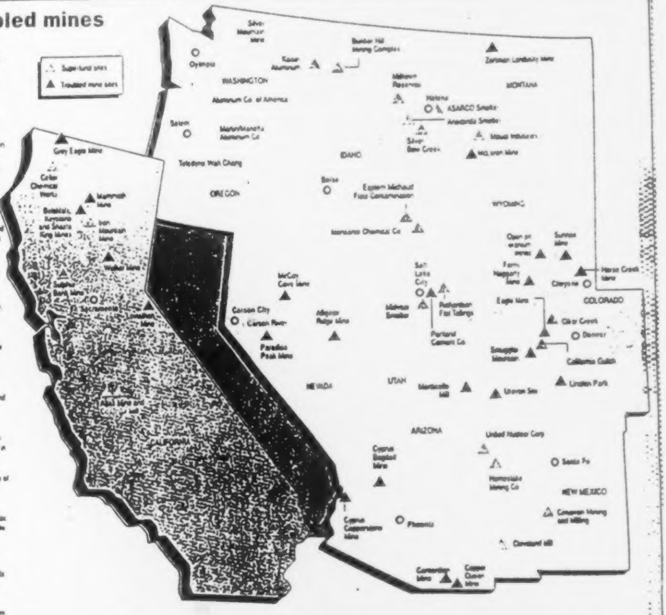
"I don't think we've lost a bird out there since the last week in September," Stirland said.

Encouraged by Stirland, state and industry officials have scheduled a workshop for March 28 and 29 on cyanide and wildlife.

"Why should every new mine have to learn the same lessons we learned the hard way – at the expense of wildlife?" he said. "That's not right – it shouldn't be that way."

A legacy of troubled mines

The West is pockmarked with mining scars large and small. In Montana alone more than 3,000 abandoned hard rock mines are in need of reclamation. Across the West, cleaning up old mines and metal processing facilities will cost billions. Many of the worst sites are targeted for cleanup under the federal Superfund program, established by Congress in 1980. But many other mines have caused problems, as well. Here is a state-by-state list of a few of the West's troubled mines, based on federal and state information.


Superfund sites
Troubled mine sites
Silver Mountain Mine
Olympia
Kaiser Aluminum
Bunker Hill Mining Complex
Zortman-Landusky Mine
WASHINGTON
Milltown Reservoir
MONTANA
Aluminum Co. of America
Helena
ASARCO Smelter
Anaconda Smelter
Salem
Martin-Marietta Aluminum Co.
Silver Bow Creek
Mouat Industries
McLaren Mine
IDAHO
Teledyne Wah Chang
Grey Eagle Mine
OREGON
Boise
Eastern Michaud Flats Contamination
Celtor Chemical Works
Mammoth Mine
WYOMING
Balaklala, Keystone and Shasta King Mines
Iron Mountain Mine
Monsanto Chemical Co.
Open pit uranium mines
Sunrise Mine
Walker Mine
Ferris-Haggarty Mine
Horse Creek Mine
McCoy Cove Mine
Salt Lake City
Cheyenne
Sulphur Bank Mine
Sacramento
Carson City
Carson River
Alligator Ridge Mine
Midvale Smelter
Richardson Flat Tailings
Eagle Mine
COLORADO
Leviathan Mine
Clear Creek
Denver
Paradise Peak Mine
Portland Cement Co.
Smuggler Mountain
California Gulch
CALIFORNIA
NEVADA
UTAH
Monticello Mill
Uravan Site
Lincoln Park
ARIZONA
United Nuclear Corp.
Cyprus-Bagdad Mine
Santa Fe
Homestake Mining Co.
NEW MEXICO
Cimarron Mining and Milling
Cyprus Copperstone Mine
Phoenix
Cleveland Mill
Cornelia Mine
Copper Queen Mine

CALIFORNIA

Atlas Mine and Coalinga Mill, Coalinga, Fresno County: Extremely high levels of chrysotile asbestos fibers have been found in surface waters.

Balaklala, Keystone and Shasta King mines, Shasta County: Toxic heavy metals and acidic wastes have resulted in periodic fish kills at the confluence of West Squaw Creek and Shasta Lake.

Celtor Chemical Works, Hoopa, Humboldt County: Old mine wastes were found to contain significant levels of cadmium, lead, arsenic, zinc, mercury and copper. Wastes were removed in 1986 but site has not been declared [illegible].

Gray Eagle Mine, Happy Camp, Siskiyou County: Cyanide, cadmium, mercury and nickel have contaminated Indian Creek, a tributary of the Klamath River.

Iron Mountain Mine, Redding, Shasta County: Iron, zinc, copper and cadmium are discharged into Keswick Reservoir on the Sacramento River. Creeks downstream are nearly devoid of aquatic life. Heavy metals have shown up in Redding's drinking water.

Leviathan Mine, Alpine County: About 22 million tons of waste have been abandoned, much of it along Leviathan and Aspen creeks. Heavy metals and acidic mine wastes have caused water quality problems since 1952.

Mammoth Mine, Redding, Shasta County: Acidic mine wastes containing heavy metals have resulted in fish kills in Shasta Lake and have almost totally eliminated aquatic life in Little Backbone Creek.

Sulphur Bank Mine, Lake County: High levels of mercury have been found in the Oaks Arm region of Clear Lake, one of California's outstanding recreational areas. Fish contain mercury levels that approach or exceed FDA limits.

Walker Mine, Quincy, Plumas County: Acidic mine wastes and heavy metals have polluted the area since 19[illegible]. Aquatic life has been eliminated in Dolly Creek and damaged in Little Grizzly Creek.

NEVADA

Alligator Ridge Mine, Ely: More than 1,400 migratory birds died at a cyanide-contaminated tailings pond at the gold mine in 1986.

Carson River site, Dayton: Fifty miles of river are contaminated with mercury from the Comstock mining boom of the late 1800s.

McCoy Cove Mine, Battle Mountain: More than 600 migratory birds died in a cyanide-tainted tailings pond in 1990 at the heap-leach gold mine.

Paradise Peak Mine, Gabbs: More than 1,300 migratory birds died in a cyanide-tainted tailings pond at the gold mine during a two-month period in 1986.

ARIZONA

Cornelia Mine: Cyanide has turned up in groundwater.

Copper Queen Mine: High levels of sulfates and nitrates have been found in wells south of a tailings impoundment.

Cyprus-Bagdad Mine: Contamination from open pit copper mine in 1978-79 damaged local fish populations.

Cyprus Copperstone Mine: Almost 900 migratory birds died in a cyanide-poisoned tailings pond over a 16-month period.

UTAH

Midvale Smelter: Arsenic, cadmium and lead have been found in large piles of slag.

Monticello Mill: Radioactive mill wastes have contaminated private and commercial properties.

Portland Cement: Lead and arsenic have been found in kiln dust.

Richardson Flat Tailings: High levels of arsenic, copper and lead have been found downstream in Silver Creek.

MONTANA

Anaconda Smelter: Arsenic, cadmium, lead and zinc pose risks to human and aquatic life.

ASARCO Smelter: Heavy metals have contaminated water, soil, crops and livestock across 100 square miles of the Helena Valley.

McLaren Mine: Acidic mine wastes and heavy metals have sterilized parts of Soda Butte Creek upstream of Yellowstone National Park.

Milltown Reservoir: High levels of arsenic have contaminated drinking water.

Mouat Industries: Chromium has polluted soil, groundwater and surface water.

Silver Bow Creek/Clark Fork River: Widespread heavy metal contamination has made this area the nation's largest Superfund site.

Zortman-Landusky Mine: Cyanide has leaked into groundwater and surface water.

IDAHO

Bunker Hill Mining Complex: Lead and zinc have contaminated soil and a nearby aquifer.

Eastern Michaud Flats: Arsenic, cadmium and selenium have been detected in groundwater.

Monsanto Chemical Co.: Arsenic, cadmium and selenium have been found in waste water.

NEW MEXICO

Cimarron Mining and Milling: Dangerous levels of cyanide have been found on site.

Cleveland Mill: Lead, silver and arsenic have seeped into a nearby creek.

Homestake Mining Co.: Pollutants from uranium tailings ponds have contaminated a shallow aquifer.

United Nuclear Corp.: In 1979, a dam broke, releasing 93 million gallons of radioactive mill tailings into the Rio Puerco River.

WYOMING

Ferris Haggarty Mine: Acidic mine wastes have sterilized parts of a mountain stream.

Horse Creek Mine: Abandoned shafts are safety problems.

Open pit uranium mines: High vertical walls pose safety problems. Radioactive wastes are scattered across the area.

Sunrise Mine: Open shafts pose safety problems.

OREGON

Martin-Marietta Aluminum Co.: Cyanide has been found in shallow and deep aquifers.

Teledyne Wah Chang: Heavy metals such as cadmium, chromium and lead have been detected in groundwater and surface water.

COLORADO

California Gulch: Acidic mine wastes and heavy metals have eliminated aquatic life.

Clear Creek: Acidic mine wastes and heavy metals have fouled drinking water.

Eagle Mine: High levels of iron, manganese and zinc have been detected in Eagle River.

Lincoln Park: Radionuclides and heavy metals have contaminated groundwater.

Smuggler Mountain: Heavy metals pose a public health risk to Aspen residents.

Uravan site: Radionuclides and heavy metals have tainted groundwater and surface water.

WASHINGTON

Aluminum Co. of America: Cyanide wastes have contaminated groundwater.

Kaiser Aluminum: Cyanide from waste potliners have contaminated an aquifer.

Silver Mountain Mine: Cyanide pollution has caused concern about potential groundwater contamination.

Bee graphic/Judy Jordan

FINAL

The Sacramento Bee

THURSDAY, MARCH 22, 1990

FOUNDED 1857 • VOLUME 267 • 35¢

© 1990 THE SACRAMENTO BEE

GOLDEN LAND, SHATTERED EARTH

Lawmakers pursue mining reforms

Last of five parts

By Tom Knudson
Bee Staff Writer

Like a storm building in the desert, mining's legacy of poisoned rivers and scarred earth is stirring big changes in the West.

Gone are the days of giddy excitement and shouts of Eureka! Today, people are more likely to shout about things like fish kills, abandoned tailings piles and the threat of lead and cadmium poisoning.

"It almost seems like you've got to have dozens of people die to get somebody's attention," said Ed Gensler, an abandoned mine land specialist with the Montana Department of State Land. "But our problems are more insidious. We've got kids with lead in their blood. It won't kill you immediately, but it does have an effect on health."

Like the strip mining disasters in Appalachia that prompted a national reclamation law for the coal industry in the mid 1970s, problems associated with the mining of

See REFORM, page A18

Continued from page A1

hard-rock minerals – such as gold, silver and copper – are driving the engine of reform out West today.

The two industries – coal and hard rock – are treated quite differently. Coal must reclaim its giant open pits. Not so with hard-rock mines. Coal pays a royalty on federal land. Hard-rock mines don't. Coal pays millions of dollars into a national fund to reclaim old mines. Hard-rock mines do not.

Two major bills have been introduced in Congress to try to address mining-related problems. And lesser changes are in the works at various state capitols in the West, including Sacramento. The primary target of both federal bills is a 19th century statute that has governed mining in the West since the days of President Ulysses S. Grant – the General Mining Law of 1872.

"We have passed the point when a 19th century law can serve the nation's 21st century mineral needs," said Rep. Nick Rahall, D-W.Va., author of one of the bills.

Here is a sampling of some of the legislative changes that are being proposed:

- Rahall's bill would establish a rental fee to mine hard-rock minerals on federal land. The money would be used to fund a national program to reclaim abandoned hard-rock mines – thousands of which mar the West. But the industry is fighting the idea.
- Both bills – the other is authored by Sen. Dale Bumpers, D-Ark. – address a variety of other problems, including the misuse of federal mining claims, the sale of public land at 1872 prices – $2.50 to $5 per acre – and the government's poor record of preventing environmental abuses.
- In California, a bill is expected to be introduced in April to correct widespread violations and poor enforcement of a 1975 state reclamation law. Among other things, Assemblyman Byron Sher, D-Palo Alto, would like to see tougher penalties and better financial guarantees to ensure that mines are reclaimed.

Like the battle over coal mining practices in Appalachia, today's controversy over hard-rock mining out West is churning up a great storm of emotion, drama and will.

"The dire need for mining law reform is one of the West's best kept secrets," said Rep. Mel Levine, D-Santa Monica, a member of the House Interior and Insular Affairs Committee. "In my view, this is one of the biggest conservation issues in the West in the 1990s."

"You can literally turn around in Nevada and parts of California and see these giant caverns that will be left to our grandchildren and their grandchildren," said Patricia Schifferle, regional director for The Wilderness Society in San Francisco.

"We require the strip miners back East to reclaim the land. I don't see why these big gold mines should be allowed to go scot-free."

But the mining industry, which is fighting the Rahall and Bumpers bills, balks at such criticism.

"People chase out every bit of wildlife in the cities, and pave every square mile. But out here where we work, they want it left" in its natural condition, said Jim Hill, a spokesman for the Newmont Mining Co.

The 1872 mining law has long been controversial. But despite a more than a century of political wrangling, the law – the last survivor of a group of frontier land laws such as the Homestead Act and the Morrill Land Grant Act – has escaped major reform, thanks largely to the titanic power of the mining industry.

"You've got to admire their tenacity," said Stewart Udall, a former secretary of the interior under Presidents Kennedy and Johnson who advocates changing the law.

"The industry is like a baseball pitcher who never loses a game. They've always had friends in Congress. And as a result, they still have the frame of mind that if they can just hang tough, they'll win again."

One of the industry's best friend's in Congress is Sen. James McClure, R-Idaho, a ranking member of the Interior Committee who recently said "the mining law has served this country well and continues to do so today." But with McClure's retirement in early 1991, advocates of reform see a chance to end the mining industry's long winning streak.

"Lots of little things are falling into place," said John Leshy, a law professor at Arizona State University and the author of a book about the mining law. "I certainly would not predict there'll be mining law reform, but I'd say it's more likely than at any time in the past 20 years."

To Udall and others, the law's biggest flaw is its exclusive focus on mining.

■■■

High in Nevada's Toiyabe Range, a new gold mine is being blasted into a mountain near the headwaters of a trout stream.

"They're going to leave a massive gash and big waste dumps," said Glenn Miller, a professor of biochemistry at the University of Nevada at Reno.

"But under the 1872 mining law, they are allowed to do that," Miller said. "They have the right to free and open access to public land, and mining is to be encouraged, not restricted."

■■■

But miners say giving government the power to reject a proposed mine would not work. Here's why, in the words of Nevada prospector Don Smith:

"You see that little red spot way up on that hill?" Smith said. "Well, there was about $6 million worth of barite (a mineral used in drilling oil wells) taken out of there not too long ago.

"Now, the guy running the U.S. Bureau of Land Management was a real environmentalist. He used to look out his window and say, 'Why don't you guys go find barite on the other side of that hill so we can't see it from town.'

"Well, that's not the way you find minerals," Smith said. "The minerals are where they're at."

To which Leshy replied: "Yes, but so is the wildlife habitat. The law's focus is very narrowly on mining and not on the kind of balancing that applies to every other use of federal land."

Another cornerstone of the mining debate is reclamation. Both pieces of proposed legislation would slap tougher reclamation requirements on the mining industry.

"We feel this is a national issue," said Jim Zoia, staff director of the House subcommittee on mining and natural resources, which is chaired by Rahall. "We've seen what can happen in Appalachia. And it seems to us that we should learn from the past and not let that happen with what's left in the West."

But the mining industry does not agree. "Reclamation is something we already do," said Jim Beizer, director of communications for the American Mining Congress. "Mining is already covered by all kinds of environmental regulations and state laws."

Some companies, such as Homestake Mining Co., spend millions on reclamation. But various studies have found that reclamation laws in the West – federal and state – are weak, not well-enforced and full of loopholes. As a result, some mines continue to leave trails of rubble and ruin across the West.

Among the laws that are foundering are the U.S. Federal Land Policy and Management Act of 1976 – which instructed the U.S. Bureau of Land Management to prevent "undue and unnecessary degradation" to Western lands – and the California Surface Mining and Reclamation Act of 1975, which mandated reclamation under the authority of local government agencies. Three states – Arizona, New Mexico and Alaska – have no reclamation laws at all.

Even Wyoming – which has strict environmental standards and requires mines to post financial surety bonds to ensure reclamation – has run into problems.

"Sometimes the bond isn't big enough," said Gary Beach, manager of Wyoming's mine reclamation program. "And in recent years, we've had problems with bonding companies going belly up."

"The regulations just don't cut it," said Professor Miller. "They don't guarantee that there's not going to be a problem."

No laws – federal or state – require reclamation of the giant open pits being excavated by modern gold mining operations. The companies say it would be too expensive.

"If it isn't economical to reclaim it, they shouldn't be mining it," said James Jensen, executive director of the Montana Environmental Information Center in Helena. "This is not 1880 – this is 1990."

Already, the pits have left parts of Nevada, California and Montana pockmarked with craters, some of which will be nearly as deep as Lake Tahoe and more than a mile wide when fully excavated.

But as Sen. McClure said recently, one man's open pit is another's scenic wonder.

"My state has many scenically grand areas, and one that interests the tourists most is the Yankee Fork," McClure said at a Senate hearing on the mining law last year.

"The Yankee Fork is an old plaster mining area which was unreclaimed and, therefore, people drive miles to see. If that area had been reclaimed, there would be far fewer people that would visit that area today."

Often, however, the issue is more than one

> ‘The dire need for mining law reform is one of the West’s best kept secrets.’
>
> **– Rep. Mel Levine, D-Santa Monica**

of visual preference. Across the West, many abandoned mines continue to belch acidic mine wastes and metallic poisons onto the landscape. And in some cases, open mine shafts have become death traps for unsuspecting hikers, hunters and other public land users.

"It's a problem that's increasing," said Mary Ann Wright, president of the Association of Abandoned Mine Land Programs in Salt Lake City, a group of states that administer mine reclamation programs supported by the coal industry. "We get calls from sheriffs' offices about this all the time.

"People think that if it's public land, it should be safe," Wright said. "That's where they get into trouble."

Although the reclamation money comes from coal mines, states are permitted to use some of it on hard-rock mines. But the money is not doled out evenly. States with a lot of coal mining – such as Wyoming – get a lot of money; others don't.

"I don't know what some of these states are going to do," said Beach in Wyoming, where officials plan to spend $300 million in coal industry money on coal and hard-rock reclamation this decade. "They'll be lucky if they've got enough to get rid of their coal problems."

Support is growing for an abandoned hard-rock reclamation program.

"Why shouldn't the industry help out and try to be a good neighbor and recognize there have been problems?" said Gensler, the abandoned mine land specialist in Montana, where about 3,000 abandoned hard-rock mines mar the landscape.

"I don't think it makes sense," said David Delcour, vice president of Amax Mineral Resources Co. in Denver and chairman of the public lands committee of the American Mining Congress.

"It's one thing to require people to reclaim. But then to say, 'Because your grandparents didn't get the job done, we're going to charge you for that, too,' that's the part I don't agree with."

Somebody will have to foot the monumental cleanup bill, expected to run into the billions of dollars. Delcour said the cost should be paid by "all the people who are demanding the products that are coming from these properties."

But Gensler disagreed.

"I don't see why the industry can't kick in a few bucks," he said. "Instead, they're still basically saying we should be overjoyed they're giving us metals – and let it go at that."

Senator **Bumpers**. I just told Senator McClure, the three guys on the left are your friends. The three guys on your right are not.

Senator **McClure** [presiding]. I would also note that members of the subcommittee may well have questions to submit to you gentlemen in writing for response to the record as is indeed I will have a few to do so. I do not intend to take further time of you gentlemen or the subcommittee this afternoon. If there be no further matter to come before the subcommittee, it will stand adjourned. Thank you.

[Whereupon, at 4:28 p.m., the hearing was adjourned.]

APPENDIXES

APPENDIX I

Responses to Additional Questions

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240

TAKE
PRIDE IN
AMERICA

IN REPLY REFER TO:
1750(140)

Honorable Jeff Bingaman
Chairman, Subcommittee on Mineral
Resources Development and Production
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

In response to your April 24, 1990 letter, we enclose responses to the additional questions submitted by Senator Bumpers and Senator McClure relating to the April 19, 1990, hearing on reclamation and bonding practices associated with hard rock mining on Federal and State lands.

We trust this information will be helpful. Do not hesitate to call on us if we can be of additional assistance.

Sincerely,

Cy Jamison
Director

Enclosures

QUESTIONS FOR THE RECORD
SENATOR BUMPERS
BUREAU OF LAND MANAGEMENT

HEARING ON
RECLAMATION AND BONDING PRACTICES ASSOCIATED WITH
HARD ROCK MINING ON FEDERAL AND STATE LANDS

1. **The February 1990 BLM publication Utah Spectrum highlighted the Timberline mine, an abandoned cyanide heap leach operation, which still contained substantial amounts of cyanide in solution and in the heap. BLM tried unsuccessfully for three years to force the company to reclaim the mine, but the company went bankrupt and BLM held no bond. The mine was reclaimed only because the county required a $20,000 bond, which BLM claims would have been insufficient to clean up the 4 acre site without volunteer assistance from another mining company.**

   - **What steps were taken by BLM to try to get the company to reclaim? Why were they unsuccessful? What could BLM have done under its regulations that it did not do?**
   - **What would BLM have done without a county bond to reclaim the site?**
   - **It was interesting to note that BLM required the heap to be flattened and recontoured. Is this required for all heap leach operations?**

Answer:

The problems BLM experienced with the operation at the Timberline Industries' (formerly Azeredo Minerals) site were the combined results of the actions of an inept operator and inadequate BLM surface management policies. Under the previous inspection policy, the operation which was initiated as a notice level activity would have been inspected only once during the calendar year. In addition, the existing national policies required the Authorized Officer to rely on State or local regulations, but provided no detailed guidance on the specifics of managing operations which use cyanide.

As a result, BLM encountered the problems with the site that were detailed in the **Utah Spectrum**. BLM was able to resolve the situation with existing authorities, policies and procedures. BLM's actions did include volunteer assistance from a responsible member of the mining community, Barrick Mercur Mining Company, a subsidiary of American Barrick Resources Corporation. This aspect of the situation is not unusual as operators on the public lands often volunteer to assist BLM in activities that are to the benefit of the public.

The Timberline operation was a notice level operation, which did not require an approved plan of operations. The regulations require the notice level operator to meet the standards in 43 CFR 3809.1-3 and to agree to conduct all required reclamation. Under the existing regulations, a notice level operator is not required to post a bond. Proposals to change this requirement are under consideration.

The regulations also provide for the filing of a mandatory plan of operations and posting of a bond for operators who have established a record of noncompliance. The regulations provide that continued noncompliance may result in actions in U.S. District Court that seek restraining orders or recovery of damages. Further, Sections 303(a) and (g) of The Federal Land Policy and Management Act (Section 302 of which provides the basis of the surface management regulations) also permits the United States to seek criminal penalties for violations of any regulation of the Secretary of the Interior.

Timberline operated the site intermittently from 1984 to 1986. In 1987, BLM advised the operator that the apparent cessation of activities without reclamation was in noncompliance with the regulations and their notice. The company submitted a revised notice which described operations for 1987 and later years, with eventual and permanent shutdown after about ten years. BLM also received periodic statements from the company that the cyanide ponds had been stabilized during periods of temporary shut-down. In early 1989, BLM received reports of wildlife losses at the site and served a notice of noncompliance on the operator. Shortly thereafter, the company filed for bankruptcy. All pursuit of the operator ceased at that point.

- When problems with the operation that were beyond the scope of the initial proposal were identified by BLM, a modified notice was requested that would serve as a basis to have the operator correct the problems. When the modified plan failed to suffice, BLM utilized the noncompliance provisions of the surface management regulations as it would have done in any other case where an operator failed to meet the requirements of the regulation. The noncompliance provisions were preceded by the customary advisories from BLM and State agencies, in the form of telephone calls and letters. BLM utilized all of the relevant provisions of the surface management regulations, except the use of restraining orders and suits for recovery of damages. In addition, BLM did not use prosecution of criminal activities provisions of Section 303 of FLPMA.

- BLM's remedial actions which involved the neutralization of the cyanide and the accompanying site reclamation would have been done regardless of the presence or absence of the county bond. It is BLM policy to take immediate response to situations that present a hazard to public health and safety. The loss of the wildlife served to alert BLM to the presence of unneutralized cyanide, contrary to the promises made by the company. The forthcoming cyanide policy will prevent a recurrence of this situation by requiring periodic reporting of cyanide concentrations, fencing of ponds to exclude wildlife, flushing cyanide from heaps, and neutralizing any cyanide in ponds at inactive operations.

One of the reclamation requirements under the surface management regulations is the reshaping or grading of disturbed areas to control runoff and ensure slope stability. As part of the original proposed operation a solution pond, which was 8 feet deep, had been dug on the site, altering the pre-existing drainage pattern. This pond trapped significant precipitation, some of which contained cyanide flushed from the leach pond. Covering the pond was necessary to restore the drainage pattern and to prevent future ponding of water. The flattening of the leach pad was necessary for the detoxification of the pad. While detoxification of all leach pads will be a feature of the forthcoming cyanide policy, any decision on flattening or recontouring pads at other operations will be a site specific decision of the Authorized Officer.

2. **It appears that the Timberline mine was in violation of its permit terms for three years, and that the facility varied considerably from the proposed and/or permit stipulated design.**

   - **What actions did BLM take to stop these violations?**
   - **Why was BLM unable to put a stop to the non-compliance occurring at this time?**
   - **Why couldn't the BLM take any corrective action until the company went bankrupt?**
   - **Why did the BLM allow the mine to continue to operate, given these violations?**

Answer

This operation was a notice level operation, which did not require an approved plan of operations. The regulations require the notice level operator to describe the operation, to meet the operating and reclamation standards in 43 CFR 3809.1-3 and to agree to conduct all required reclamation.

- When problems with the operation that were beyond the scope of the initial proposal were identified by BLM, a modified notice was requested that would serve as a basis to have the operator correct the problems. When the modified plan failed to suffice, BLM utilized the noncompliance provisions of the surface management regulations as it would have done in any other case where an operator failed to meet the requirements of the regulation.

- Simply stating that some aspect of an operation is in noncompliance and to order its cessation will not solve the on the ground problem. The key to resolving such problems is to work with an operator. In 1987, BLM advised the operator that the apparent cessation of activities without reclamation was in noncompliance with the regulations and their notice. The company submitted a revised notice which described operations for 1987 and later years, with eventual and permanent shutdown after about ten years. BLM found the revised notice to be acceptable, since it contained environmental protection and reclamation measures which were soon to be implemented and which would serve to resolve the problem.

  The operator met with the BLM several times to determine what was needed to bring the operation into compliance. Throughout this process BLM assumed that the operator had the intent and the resources to implement the revised notice. Further complicating the process was the fact that the company was based out of state. BLM also received periodic statements from the company that the cyanide ponds had been stabilized during periods of temporary shut-down. By 1989, BLM had determined that resolution of the noncompliance process would not succeed and began to consider the use of court orders.

- It is axiomatic that the simple act of stopping an operation will not resolve existing problems and they will remain problems until either the operator or BLM takes action to correct them. BLM's policy is that it is better to allow an operator the opportunity to correct the problems through the noncompliance process of the regulations before BLM attempts to undertake the corrective actions.

- BLM allowed the operation to continue because it is better to allow an operator the opportunity to correct the problems through the noncompliance process of the regulations. In this case, inadequate inspection and enforcement procedures served to frustrate the policy and to allow the situation to continue for as long as it did.

3. **What is the objective of a reclamation bond for a mining operation? What is it intended to cover in terms of the cost of reclamation?**

   - **To what extent do current bonds take into account potential water reclamation needs resulting from mining operations?**
   - **Does the calculation of the bond amount assume that a third party contractor will perform the reclamation work if the operator fails to do so?**
   - **How does the authorizing officer determine if a bond is required?**
   - **What is the default rate on bonding?**
   - **For how many abandoned operations (by number and as a percentage of total) was the bond amount insufficient?**
   - **Please provide a list by state for each of the past 10 years the amount of federal or state money used to reclaim hard rock mining operations on BLM land, and the number of acres reclaimed.**

Answer

The objective of requiring a reclamation bond of operators is to ensure that mining operations are reclaimed once mining activities cease. The reclamation bond accomplishes this through (1) providing a financial incentive to the operator to complete reclamation and (2) providing funds for reclamation in the event that an operation is abandoned. One of the most significant aspects of bonding to the operator is the effect that forfeiting a bond has upon the operator. Such action carries significant repercussions upon an operator's credit rating and virtually precludes the chances of an operator operating again without a large cash bond.

The amount of coverage of reclamation bonds varies considerably. Depending upon individual State law, type of operation, and potential environmental impacts, the bond may be calculated on a set amount-per-acre basis, a phased approach, or for the full cost of reclamation.

- We are unsure of the meaning of the term "potential water reclamation needs". If the term refers to water treatment, a bond may be calculated to take into account the need for treatment or removal of toxic substances (e.g., cyanide, acid mine drainage) prior to discharge. In such a case, identification of the need for water treatment should occur through plan review. The decision to bond for such treatment would be dependent upon the potential for water degradation, internal policy, and the applicable State National Pollution Discharge Elimination System regulations and laws as required by Sections 402 and 404 of the Clean Water Act.

- When a bond is calculated for the full cost of reclamation, the bond amount is based upon the cost of reclamation by a third party in the event that the operator fails to reclaim and includes BLM's administrative costs to administer the reclamation.
- Determination of the need for and amount of a bond is generally left to the individual State; however, at present, the authorized officer may determine that an additional bond is required on an individual basis based upon the potential for undue or unnecessary degradation. Approximately 95% of bonds for operations on BLM administered lands are held by the States.
- Most bonds are State bonds; therefore, BLM does not maintain records of default rates. Recent testimony on Colorado State bonds indicates that the default rates are low. Based upon a review of the field offices last year for Senator Bumpers' questions for the Interior Department, less than 10 operations lost bonds due to failure to reclaim or follow the approved plan of operations.
- The information requested is not currently available nationwide within the time frame given for answering these questions. Generally, operations upon which a bond is held are not likely to be abandoned.
- We do not maintain this type of information. This program is generally undertaken by the State governments.

The changing BLM surface management program will result in the gathering of information related to bonding issues as bonding practices within BLM become standardized. This will enable BLM to identify problems related to bonding and provide more detailed information on all aspects of bonding.

4. Is phased bonding currently used by BLM? Are you aware of any current use of phased bonding?

- **Do you believe phased bonding would be effective in assisting operators in obtaining bonds and in assuring reclamation?**

ANSWER

BLM supports the concept of phased bonding. BLM policy will require incremental concurrent reclamation at existing active operations. Phased bonding must be coupled with phased approvals to be effective. Bond release for any given phase occurs upon satisfactory reclamation of said phase. Reclamation at the earliest feasible time for all projects is the stated goal of the surface management rules as it minimizes surface disturbance and reduces the liability of the operator at any given time. Bonding for the current amount of disturbance is used in most cases and incremental reclamation is encouraged.

- Phased bonding needs to be accompanied by well defined reclamation goals. The operator as well as BLM must be able to determine when reclamation has been completed.

5. **In Mr. Belsky's testimony he stated that the revegetation period for bonding should be reduced to no longer than one or two years.**

   - **Has it been your experience that it can be determined that revegetation is successful in this time period?**

Answer

The period for liability for revegetation should vary on a case-by-case basis dependent upon local climatic factors, land uses, type of operation, presence of potentially acid/toxic material, reclamation plan, and other considerations. A short, one year liability period may serve to encourage operators to seed with species known for immediate, short term success, but which die out after several years. Such a short revegetation liability period may, in some cases, be insufficient to ensure that the revegetation is capable of self regeneration.

BLM would rather determine revegetation liability individually, taking into account the local growing conditions, the proposed reclamation plan, and site specific factors influencing revegetation. BLM does not intend to hold any operator liable for revegetation success outside of what is reasonable and practicable for a given area, nor does BLM desire to remove the operator from his obligation to achieve acceptable, permanent revegetation.

6. **BLM regulations at 43 CFR 3809 require the operator to prevent unnecessary and undue degradation during mining and reclamation of an operation. Consider a hypothetical mining situation where the type of overburden indicates that exposure of the ore seam to be mined will create acid mine drainage from the site.**

   - o **Would you consider the discharge of acid mine drainage undue or unnecessary?**

   - o **How would the BLM address this hypothetical problem during the plan of operation approval stage?**

Answer

- o Discharge of acid mine drainage from a mine site would be considered undue or unnecessary degradation as treatment of such drainage is a customary practice among mining operations. Additionally, such a discharge would be a violation of Federal and State water quality regulations.

- o BLM does not routinely require overburden/ore body analysis for potential creation of acid mine drainage. In the event that such information was provided in the plan submitted by an operator, or the potential for drainage was identified in the Environmental Assessment, or if BLM was aware of the potential for such problems in a specific area, BLM would require the operator to address mitigation measures to be employed at the site to minimize/treat such drainage. This potential would be addressed through the National Pollution Discharge Elimination permitting process and through coordination with State regulatory authorities. The State regulatory authorities would require mitigative measures prior to issuing a permit or permits for such an operation.

7. **What enforcement mechanisms other than bonding are available to the Bureau to make sure reclamation is performed?**

Answer:

The failure to reclaim can subject an operator to two specific penalties in the 43 CFR 3809 regulations and to one general penalty found in the Federal Land Policy and Management Act. Both of the regulatory penalties may be invoked upon the failure of an operator to undertake the steps required by a Notice of Noncompliance, within the specified time frames.

> The first is the requirement to conduct all subsequent activities as a plan of operations even if those activities are ordinarily notice level actions. Operators would have to post a mandatory bond in addition to any state bonds prior to receiving an approval of the proposed plan. Subsequent operations that are conducted without the approved plan and the posted bond can result in the imposition of criminal penalties.
>
> The second penalty is the use of injunctive relief. In this case BLM would ask the United States Attorney to enjoin the operator in a United States Court. An estimate of the costs to remedy the unreclaimed disturbance could be provided to the Court and the operator could be held liable for damages in the amount of the estimate.
>
> Lastly, BLM may ask the United States Attorney to investigate a failure to undertake necessary reclamation as a violation of 43 USC 1733(g). In this instance, the US Attorney would investigate the matter and, if persuaded by BLM's case record, refer the matter to a grand jury for possible indictment and subsequent trial.

In addition, BLM can report various failures to numerous other Federal, State, and local permit authorities involved. Any and all of these enforcement authorities could be activated. For example, at one mining operation in California, a total of 327 permits were required. The vast array of regulatory aspects covered by these permits, when enforced, is quite sufficient to ensure compliance by an operator.

8. Does the Bureau or any state surface managing agency with which the Bureau has an MOU require that state-of-the-art technologies or practices be used in every reclamation plan?

- **If not, why not?**
- **Using acid mine drainage for example, what is the state-of-the-art technology for preventing acid mine drainage?**
- **Are these technologies or practices required in every case where acid mine drainage is a potential problem? If not, why not?**

Answer

- If the term "state-of-the-art technologies or practices" is assumed to mean the best available technologies, neither BLM nor any State surface managing agency with which BLM has a MOU requires that state-of-the-art technologies or practices be used in a reclamation plan. State-of-the-art technology is not required because BLM administers its surface management program based on the guidance provided in 43 CFR 3809. In 43 CFR 3809.0-5 reclamation is defined as "taking such reasonable measures as will prevent unnecessary or undue degradation of the Federal lands, including reshaping land disturbed by operations to an appropriate contour and, where necessary, revegetating disturbed areas so as to provide a diverse vegetative cover." BLM requires operators to employ standard industry practices. The guiding principles are "reasonable measures" and the prevention of "unnecessary or undue degradation".
- Practices for preventing acid mine drainage include identification of potentially acid/toxic strata, limited disturbance and exposure of such strata, isolation of such strata within the backfill under reducing (i.e., non-oxidizing) conditions, grading and sloping to reduce contact with both surface and infiltrating ground water, and treatment with bactericides or alkaline addition to inhibit oxidation of sulfides (primarily framboidal pyrite) and the associated production of acidity.
- The above practices are not uniformly required of every operation with a potential for acid mine drainage. Instead, mitigative measures should be chosen based upon operating conditions, including climate (e.g., rainfall), type of operation, overburden characteristics, slope, drainage characteristics, and other site-specific factors.

9. **How would you define the purpose and goal of mined land reclamation?**

   - **Is it returning the land to its approximate original contour or previous production? Returning the land to a beneficial and productive use?**

Answer:

BLM defines reclamation through its regulations and policy. The regulations at 43 CFR 3809.0-5 (k) and (j) define reclamation and unnecessary or undue degradation:

> (j) ''Reclamation'' means taking such reasonable measures as will prevent unnecessary or undue degradation of the Federal lands, including reshaping land disturbed by operations to an appropriate contour and, where necessary, revegetating disturbed areas so as to provide a diverse vegetative cover. Reclamation may not be required where the retention of a stable highwall or other mine workings is needed to preserve evidence of mineralization.

The regulations at 43 CFR 3809.0-5 (j) define unnecessary or undue degradation as being among other things,

> as surface disturbance greater than what would normally result when an activity is being accomplished by a prudent operator in usual, customary, and proficient operations of similar character and taking into consideration the effects of operations on other resources and land uses, including those resources and uses outside the area of operations... Where specific statutory authority requires the attainment of a stated level of protection or reclamation, such as in the California Desert Conservation Area, Wild and Scenic Rivers, areas designated as part of the National Wilderness System administered by BLM and other such areas, that level of protection shall be met.

BLM surface management manual section 3809.11A which sets the policy with respect to reclamation states:

> Reasonable reclamation of surface disturbance is required of all operators, regardless of the level of operations. Mining claims are commonly leased and the claimants are often unaware of the level of operations occurring on the claims. The mining claimants are ultimately responsible for reclamation if the operator abandons the operation.
>
> 1. Some situations may require only reshaping or grading, and the placement of erosion control measures on the slopes, particularly where revegetation is impracticable.
>
> 2. Most situations will require some form of revegetation.
>
> 3. Some situations may lend themselves to secondary uses of a disturbed area, rather than simple reshaping and revegetation. Secondary uses may include the development of wildlife habitat, or other uses authorized by Section 302(b) of Federal Land Policy and Management Act. If operators and mining claimants choose to incorporate such secondary uses into reclamation plans and the proposed secondary use is consistent with land use planning, such uses are to be considered as a viable option to standard reclamation practices.

10. **What authority does the BLM have to require modification in a plan of operations to protect the environment or other multiple use values? For instance, can the BLM preclude an operator from using surface mining methods if the ore can be extracted using deep mining technology? Please provide examples of plan of operations changed at BLM's request to protect environmental values or other multiple use values.**

ANSWER

Under 43 CFR 3809.1-7(a) BLM may request plan modification at any time during operations under an approved plan. Under regulations at 43 CFR 3809.1-6(a), the BLM can also request changes in or additions to the plan necessary to assure protection of nonmineral resources.

EXAMPLES

Coeur Rochester Mine, Imlay, Nevada: Identification of important sage grouse habitat during environmental review required modification of the proposal.

Wind Mountain Mine, Empire, Nevada: Mitigating measures required for recovery of National Register eligible prehistoric cultural resources involve costs which exceed the value of the material to be mined. The mine proposal has been modified to avoid the cultural resources rather than recover them.

11. How many mines have been successfully reclaimed by the operator since the surface management regulations went into effect?

Answer

The question fails to differentiate between actual mining operations and exploration activities conducted prior to or as part of on-going mining operations. Since the inception of the surface management program in 1981, numerous proposed mining operations have been approved by BLM under plans of operations. Many of these operations have been of a long-term nature due to both the economics of the industry and scope of the proposed operations. Some have involved remining previously disturbed areas. Few of these operations have been totally reclaimed as portions of many are still active.

As plans of operations are issued for both mining and exploration activities and many approved mining activities are ongoing, albeit partially reclaimed, it is difficult for BLM at present to provide exact numbers of successfully reclaimed mines. However, as part of BLM's recent surface management initiatives, BLM has started the process of inventorying the status of reclamation at all 3809/3802 sites authorized since 1/1/81, and has standardized the documentation process. The first part of that effort, reviewing and updating case files, is near completion. The planning effort for conducting actual field inspections of all 3809/3802 sites is currently underway.

12. How many sites are considered to be in "inactive" status? What reclamation obligations exist for "inactive" mines?

Answer:

The exact number of "inactive" operations is quite dynamic. Operations may be inactive for any number of reasons, including seasonal shut-downs, labor or market conditions, and technical or engineering reasons. For example, in preparing a survey of activities for other purposes, the Nevada State Office determined that 18 of the approximately 115 mining operations using cyanide in 1988 were inactive. At any given time 10 to 15 percent of operations may be on an inactive status.

The reclamation and stabilization requirements for inactive operations are found in the surface management regulations. The regulations at 43 CFR 3809.3-7 provides that during periods of nonoperation:

> All operators shall maintain the site, structures and other facilities of the operations in a safe and clean condition during any non-operating periods. All operators may be required, after an extended period of nonoperation for other than seasonal operations, to remove all structures, equipment and other facilities and reclaim the site of operations, unless he/she receives permission, in writing, from the authorized officer to do otherwise.

BLM policy found in the surface management manual provides that:

> All operators are required to maintain their sites, structures, and other facilities in a safe and clean condition during any period of nonoperation. Some operators may be required, after an extended period of nonoperation for other than seasonal shutdowns, to remove all structures, equipment, other facilities, and reclaim the site, unless the operator receives written permission from the authorized officer to do otherwise. This provision shall not apply to operations that are placed on standby status due to circumstances beyond the control of the operator, such as depressed market conditions, extended labor disputes, or disputed ownership.

13. According to a quote by an official of Homestake Mining, it used to be common practice to discharge tailings into the local creek (Sacramento Bee article 3/18/90, p. A10). How are tailings disposal areas designed and reclaimed today?

In what situations, if any, are liners required?

Answer: Tailings disposal areas are designed to meet best management practices (BMP's) consistent with all State and Federal standards for the treatment and disposal of solid wastes, including but not limited to, regulations issued pursuant to the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act(42 U.S.C. 6901 **et seq**). All tailings are required to be treated to minimize, so far as practicable, their impact on the lands. Recontouring and revegetation of the tailings using overburden cover is done to the extent practicable. Liners are required where the aforementioned standards necessitate their use to prevent any unnecessary or undue degradation from occurring such as groundwater contamination.

14. **The BLM has stated that fish and wildlife, recreation, and protection of riparian areas are its highest priorities for this year. How are these priorities reflected in the surface management for hardrock minerals?**

Answer:

The resource values that you have listed have been an integral part of the surface management program since its inception. The regulations at 43 CFR 3809. 1-3 which apply to both plan and notice level operations provide for reclamation to include:

Saving of topsoil for final application after reshaping of disturbed areas have been completed;

Measures to control erosion, landslides, and water runoff;

Measures to isolate, remove, or control toxic materials;

Reshaping the area disturbed, application of the topsoil, and revegetation of disturbed areas, where reasonably practicable; and

Rehabilitation of fisheries and wildlife habitat.

In many instances the resources that you have mentioned are found in the special category lands in the surface management regulations that require the approval of a plan prior to conducting operations. During the review of the plan all of the resources will receive review and consideration. When activities proposed by an operator are necessary or due, BLM will consider reasonable modifications to accommodate the above resource concerns and approve the plan subject to the acceptance of the modifications.

15. How many inspectors does BLM have to inspect the mining claims and active operations in:

- **The Fulsome District (sic) in California**
- **California**
- **Nevada**
- **New Mexico**
- **Montana**

Answer

The numbers given below implicitly define an inspector as a person involved in the surface management program for greater than 50% of his/her time. These numbers are based on FY 89 information.

- Folsom Resource Area in the Bakersfield District, California - 2 inspectors (note: There is no Fulsome District).
- California - 16 inspectors.
- Nevada - 27 inspectors.
- New Mexico - 1 inspector.
- Montana - 6 inspectors.

16. What standards are used to determine reclamation success?

- **How long are bonds held past reclamation to ensure reclamation is successful? Is this adequate?**
- **How is it decided what the post-mining land use of a mining operation will be?**

Answer

BLM does not choose to utilize national performance standards for determining reclamation success. Reclamation success is based upon the definition of reclamation at 43 CFR 3809.0-5, that the operator take reasonable measures to prevent unnecessary or undue degradation and perform reasonable reclamation. BLM uses site-specific standards tailored for each operation. The development of these standards is based on the careful review of each individual operation's proposed activities and operating methods and the proposed post mining land use at the close of the operation.

- State bonds are held until State standards for reclamation are satisfied. In the event that the Bureau required a bond in addition to the State bond, that bond would be held until the authorized officer is satisfied that reclamation is successful.
- The post-mining land use is based upon the Resource Management Plan (RMP) for the particular area in which the mining operation is located. Generally, the post-mining land use will be the land use prior to mining, however other uses may also be permissible.

17. According to the U.S. Environmental Protection Agency, mining wastes pile up at a rate of 30 billion tons a year (Sacramento Bee, 3/18/90, p. A10).

- **What reclamation standards does BLM use to deal with mining waste piles that may contain toxic substances or heavy metals.**

Answer:

The Bureau of Mines and the EPA both report that mine wastes "pile up" at a rate of approximately 1 to 3 billion tons per year and not at the rate of 30 billion tons as reported. BLM through the provisions of the 43 CFR 3809 regulations utilizes site specific standards developed by BLM and other Federal agencies and State reclamation standards. In addition an operation must be in conformance with 43 CFR 3809.2-2 which states, among other things,

> All operations, including casual use and operations under either a notice (§ 3809.1-3) or a plan of operations (§ 3809.1-4 of this title),... shall comply with all pertinent Federal and State laws, including but not limited to the following:
>
> (a) Air quality. All operators shall comply with applicable Federal and State air quality standards, including the Clean Air Act (42 U.S.C. 1857 et seq.).
>
> (b) Water quality. All operators shall comply with applicable Federal and State water quality standards, including the Federal Water Pollution Control Act, as amended (30 U.S.C. 1151 et seq.).
>
> (c) Solid wastes. All operators shall comply with applicable Federal and State standards for the disposal and treatment of solid wastes, including regulations issued pursuant to the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (42 U.S.C. 6901 et seq.)....

Taken as a whole, BLM believes that the existing regulatory framework provides sufficient standards to deal with all components of mining operations. The list of materials being moved in a mining operation includes overburden, host rock that is either ore or sub-ore, and interburden. Each class of material is managed according to composition, surrounding circumstances, initial or intermediate uses, ultimate use, and final placement. All of these uses are controlled by some portion of the existing regulatory framework, which can assume staggering proportions for a mining operation. One operator has identified no less than 75 existing regulatory standards and requirements that simply address mine wastes. In another instance a company needed to acquire 327 separate permits before operations could begin at its mine in California.

18. What are the procedures for handling amendments to an operating permit? Are they uniform? Is there opportunity for public involvement?

ANSWER

For BLM purposes, the procedures for amendments are listed at 43 CFR 3809.1-7. They are uniform to the degree that NEPA analysis is uniform. Issues which require public involvement under NEPA process receive public review. Additional procedures will likely be required by the other State, Federal and local permits.

19. Will angle of repose slopes be permitted in mining plans? Will they be left at angle-of-repose? What if they cannot be revegetated?

Answer

Angle-of-repose slopes are allowed as long as an operator satisfies all applicable State regulations and the applicable 3809 regulations requiring reclamation. These waste rock dumps will be left at angle-of-repose. In the event that an operator attempts revegetation on such a structure, and it fails, the authorized officer may grant an exemption from the requirement for revegetation or the operator may be required to attempt revegetation again.

20. **When BLM considers preparing an EIS for a mine, does it take cumulative effects of adjacent mining on patented lands into account.**

Answer:

The NEPA (National Environmental Policy Act) process requires a reasoned analysis of the direct, indirect and cumulative impacts of a proposed action and the alternatives. The impacts arising from adjacent activities must be sufficiently synergistic to warrant inclusion in analysis. This analysis must obviously include the cumulative impacts from surrounding activities, even if they originate on private lands.

21. Please provide the following, broken down by state:

- **the number of active heap leach operations on BLM lands;**
- **the number of inactive heap leach operations on BLM lands;**
- **the number of active vat leach operations on BLM lands;**
- **the number of inactive vat leach operations on BLM lands.**

Answer

In a report prepared for other purposes, using data current as of FY 88, there were 154 precious metal operations which utilized cyanide on public lands administered by BLM. The distribution of these operations among the three categories; Heap Leach Only, Heap Leach Plus Vat Leach/Other Methods, and Vat Leach, is shown in the table below. The exact number of "inactive" operations is quite dynamic. Operations may be inactive for any number of reasons, including seasonal shut-downs, labor or market conditions, and technical or engineering reasons. For example, the Nevada State Office determined that 18 of the approximately 114 mining operations using cyanide in 1988 were inactive. At any given time 10 to 15 percent of operations may be on an inactive status.

TYPE/STATE	AK	AZ	CA	CO	ID	MT	NM	NV	OR	UT	WY
HEAP LEACH	-	11	9	4	3	3	1	74	2	-	-
HEAP LEACH PLUS VAT LEACH/OTHER METHODS	-	2	2	-	-	-	-	21	-	1	-
VAT LEACH	-	-	2	-	1	4	-	9	1	1	-

22. **What is done today, or what can be done, to prevent an open pit from becoming a future superfund site, as is the Berkley pit in Montana?**

Answer:

The Berkley pit at Butte, Montana is not a superfund site. The superfund site, Silver Bow Creek, received tailings from underground operations that preceded the development of the pit. Most of the existing superfund sites that involve mining activities have their origins in practices that predate the enactment of the substantive environmental laws.

We believe that the stringent regulatory environment that industry operates in will serve to drastically lessen the possibility that an open pit will be a future superfund site. The existing regulatory framework provides sufficient standards to deal with mining waste. This regulatory framework can assume staggering proportions for a mining operation. One operator has identified no less than 75 existing regulatory requirements that address mine wastes. In another instance a company developing a mine needed to acquire 327 separate permits before operations could begin.

23. **Why do BLM standards for NEPA compliance vary from state to state? For example, in California, an EIS is being required for the Castle Mountain mine, in Oregon, an EIS is being required for Grassy Mountain, in Alaska, an EIS is being required by BLM for the Alaska-Juneau Mine. But in Nevada, no EIS has ever been required for a BLM mine until recently.**

Answer:

There is a uniform standard for NEPA compliance within BLM. It is found in Departmental Manual Section, 516 DM 6, Appendix 5. That standard requires that an EIS will normally be prepared for non-coal mines with greater than 640 acres of disturbance. This standard, however, is not binding.

If, at the conclusion of an environmental analysis, the impacts of an operation can be shown to be insignificant or have been mitigated to such an extent that the modifications completely compensate for any adverse environmental impacts stemming from the original proposal, the statutory threshold of significant environmental effects will not be crossed, and an EIS will not be required. (Cabinet Mountains Wilderness/Scotchman's Peak Grizzley Bears, et al. v. R. Max Petersen, et al., 510 F. Supp. 1186 (D.D.C. 1981) affirmed, 685 F.2d., 678 (D.C.C. 1982).)

If in the case of an operation that exceeds 640 acres, the foregoing is true, the authorized officer is not required to proceed with an EIS, but may choose to do so anyway. If the authorized officer decides not to proceed with an EIS, public notice of the decision must be made and the decision or approval of the operation must wait for 30 days after the completion of the environmental analysis.

With respect to Nevada, the BLM State Office has for several years, followed the NEPA process by first scoping the issues to determine the initial level of analysis. In most cases this has resulted in an EA, but if significant impacts become evident in the EA, they have proceeded to an EIS. However, if initial scoping shows the potential for significant impacts, they have proceeded directly to an EIS.

The Nevada State Office has prepared EISs on mines in the past and is now in the process of scoping with the intent to proceed to an EIS on two proposed large mines. They expect to complete EISs on a much larger proportion of mining operations in the future due to the need to examine cumulative impacts that were not as predictable as they were a few years ago. Due to increased levels of mining activity, there is a need for increased levels of analysis, even in the back country.

24. Do reclamation experts in the industry, agencies, and general public have any organized way to share information regarding reclamation technology? Is there an electronic data bank available on existing technology -- successes and failures -- or are companies and land managers and interested citizens reinventing the wheel every time a new mining project comes up? Can the Federal Government assist in developing a technology transfer computer network?

Answer

BLM maintains a technical library at the Denver Service Center from which current publications and research papers on reclamation are available. The Service Center library system can access over 100 data bases for pertinent technical publications. Additionally, BLM has actively supported and participated in the recent High Altitude Revegetation Conference and the Billings Reclamation Symposium. BLM publishes BLM Monthly Alert, which contains a list of national research management articles including articles on reclamation.

The Department of Interior's Office of Surface Mining publishes RecTec, a publication devoted to current reclamation symposium, meetings, and research. There are numerous State and national groups in addition to conferences and symposium devoted to reclamation issues, including the National Association of State Land Reclamationists and the National Symposium on Mining. Several magazines devoted to the mining industry frequently include articles on reclamation issues. Additionally, several universities offer programs in reclamation.

QUESTIONS FOR THE RECORD
SENATOR McCLURE
BUREAU OF LAND MANAGEMENT

HEARING ON
RECLAMATION AND BONDING PRACTICES ASSOCIATED WITH
HARD ROCK MINING ON FEDERAL AND STATE LANDS

1. **The General Accounting Office has issued a number of reports in the past few years on the subject of reclamation associated with hard rock mining. Do you believe that the information collected in these reports accurately reflects the current state of reclamation on BLM lands?**

Answer:

We do not believe that these reports have been sufficient for our management purposes or have been sufficient to allow a casual reader to make an informed judgement as to the state of reclamation on BLM lands. Generally the reports have been based on narrowly focused, anecdotal, "field" examples that serve as "proof" for a particular point. The reports have then gone on to argue these points are the norm, when in fact the examples have been far removed from the normal situation encountered on BLM administered lands.

When an attempt has been made to take a "statistically correct" sample of the situation, the limited sample size introduced errors of sufficient magnitude that, when found in other sampling programs, would have required at least additional sampling, if not a complete redesign of the study. Rather than do either, the data was used to develop a report that provided nothing of value for making informed management decisions. In this last case, this is quite unfortunate since BLM, at the outset of the study, expressed strong interest in obtaining suitable results that would assist the BLM in making significant program decisions related to pre- regulation unreclaimed surface disturbance.

2. **I am concerned that bonding requirements should not be so prohibitive as to ensure that small operators will be put out of business. You indicated at the hearing that your goal is to implement a policy of mandatory bonding for all operations. What kinds of financial guarantees are you considering which would allow small operators to meet this requirement?**

Answer:

We share your concerns about the small miner, or the Junior operator. In the current North American mineral industry structure there is little in the way of grassroots exploration on the part of the larger companies, often referred to as "Majors," whose focus tends to be more on production than exploration. Exploration has, for the most part, been left to the small company and the individual operator, usually referred to as "Juniors." Juniors often spend considerable time and effort to develop submittal properties to the Majors for consideration.

Precious and base metal mining has become increasingly concentrated in a fewer number of capital- rich companies that have ready access to the Asian and European capital markets. In contrast to the mining company Majors, the exploration company Juniors tend to be capital- poor with limited cash reserves and limited access to the capital markets of North America, Asia or Europe.

In order to keep the Juniors and the more traditional "small miner" active in the domestic industry, BLM is considering a variety of alternative financial instruments, most of which will require a regulatory change. Among the alternatives under consideration are:

Surety bonds, including third party surety bonds;

Certificates of Deposit, Savings Accounts, or Letters of Credit from a Federally chartered financial institution;

Deeds of Trust for mining or non-mining fee simple property, excluding personal property; and

US Government, State and Municipal bonds, Commercial bonds and notes with a Standard and Poors rating of AA or better.

3. **What percentage of mining operations are "notice level"?**

Answer:

Notice level operations make up approximately 80 percent of the new filings received by BLM. Each year we receive about 1900 to 2000 notices and approximately 450 to 500 plans.

4. Does BLM delegate full responsibility to any of the States it has MOU's with?

Answer:

No. There are certain responsibilities that we may not delegate such as Threatened and Endangered Species consultation and coordination with the US Fish and Wildlife Service. The surface management rules at 43 CFR 3809.3-1 provide for entering into MOU's with State agencies. This section is explicit in its prohibition against pre-empting State laws or regulations regarding conduct of operations or reclamation on Federal lands. The regulations allow for programs that are intended to meet the goals of the regulations: preventing unnecessary or undue degradation of the public lands, reducing administrative delay, and avoiding duplication in the administration and enforcement of the laws. Whenever possible the agreements may provide for State administration and enforcement of such programs.

BLM policy guidance on cooperative agreements has allowed two general forms of cooperative agreement to be developed: those with a major role for the State verging on the complete administration of the joint program by the State; and those in which the State plays a secondary role to BLM's role. In the latter cooperative agreements, BLM generally has more available personnel than the State and assumes a greater role in compliance on Federal lands. In both types of programs, standards of practice and reclamation guidelines developed by the State are generally adopted by BLM.

United States Department of Agriculture
Forest Service
Washington Office
14th & Independence SW
P.O. Box 96090
Washington, DC 20090-6090

Reply To: 1510

Date: JUL 26 1990

The Honorable Jeff Bingaman
Chairman, Subcommittee on Mineral Resources
  Development and Production
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

Enclosed is our response to questions arising from the April 19 oversight hearing concerning reclamation and bonding practices associated with hardrock mining operations.

Sincerely,

For F. DALE ROBERTSON
Chief

Enclosure

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

QUESTIONS AND ANSWERS FROM APRIL 19 OVERSIGHT HEARING ON RECLAMATION AND BONDING PRACTICES ASSOCIATED WITH HARDROCK MINING ON FEDERAL AND STATE LANDS

1. What is the objective of a reclamation bond for a mining operation? What is it intended to cover in terms of the cost of reclamation? How is a reclamation bond calculated? To what extent do current bonds take into account potential water reclamation needs resulting from mining operations? Does the calculation of the bond amount assume that a third party contractor will perform the reclamation work if the operator fails to do so?

The objective of bonding is to cover the cost to the Government of accomplishing reclamation specified in the plan of operation, including any water reclamation, should the operator fail to reclaim. The amount of the bond is calculated using the actual cost to the Forest Service of performing the reclamation by force account or through an independent contractor.

2. According to some Forest Service figures, approximately 85% of Forest Service plans of operations are bonded or have financial guarantees, ranging from $100 to $1.8 million, with an average value of $5,100. How much reclamation can be accomplished with $5,000?

It is difficult to describe the amount of reclamation activities that can be accomplished for $5,000 because of the variability of the mining projects and reclamation requirements. From data provided by the Forest Service and Bureau of Land Management, the General Accounting Office, in their April 1988 Report and Assessment of Hardrock Mining Damage, estimated that it would cost about $49 million to reclaim about 49 thousand acres of land recently disturbed by mining.

3. Do you believe phased bonding would be effective in assisting operators in obtaining bonds and in assuring reclamation?

Our bonding amounts must match the reclamation needs generated by the operator. If the operator phases his work, we can phase bond amounts.

Our goal on any given project is to keep the amount of area disturbed and unreclaimed to the minimum necessary to conduct current operations with reasonable allowance for flexibility in timing the opening of new areas and accomplishing reclamation. We also make partial bond releases when major phases, such as "recontouring," have been completed.

4. In Mr. Belsky's testimony he states that the revegetation period should be reduced to no longer than one or two years. Has it been your experience that it can be determined that revegetation is successful in this time period?

On some favorable sites, we can determine revegetation success in 1 to 2 years. On other sites, it may take much longer. We do not believe that revegetation success should be based on a set number of years. It should be based on a measurable result determined for each individual site.

5. What enforcement mechanisms other than bonding are available to state and federal agencies to make sure reclamation is performed?

The best way to ensure that reclamation is performed is through periodic on-the-ground visits to the mine site to monitor the work being done and ensure the operator is keeping reclamation as current as possible. Using the bond is a last resort. If bond money is inadequate, we can take action against the miner to require additional payments or work.

In oil and gas activity, we have authority to debar individuals and/or companies from future activity when they have defaults on reclamation requirements.

6. Does the Forest Service or any state surface managing agency with which the Forest Service has an Memorandum of Understanding (MOU) require that state-of-the-art technologies or practices be used in every reclamation plan? If not, why not? What are the state-of-the-art technologies for preventing acid mine drainage? Are these technologies or practices required in every case where acid mine drainage is a potential problem? If not, why not?

We require that the reclamation techniques or technology used be effective in meeting the reclamation standard established in the plan. This is the case whether we are dealing directly with an operator or through a State under an MOU

The basic methods or technology for preventing acid drainage require the elimination of opportunities for air and water to come into contact with and/or move through sulfide or other material with the potential to produce toxic substances. Covering and/or revegetation and water control are the specific prevention measures employed. These are used in those cases where acid mine drainage is a potential problem.

On June 4, 1990, the Forest Service (FS) and the Bureau of Mines (BOM) signed an MOU coordinating FS management activities and BOM's research directed at prediction, prevention, mitigation, and control or treatment of acid mine drainage. This will allow use of new technology as soon as it is developed.

7. How would you define the purpose and goal of mined land reclamation? Is it returning the land to its approximate original contour or previous condition? Returning the land to a beneficial and productive use?

The Forest Service definition of reclamation is those actions performed during or after mineral activities to shape, stabilize, revegetate, or otherwise treat the affected lands in order to achieve a safe and ecologically stable condition and land use that is consistent with long-term forest and resource management plans and local environmental conditions (FSM 2840.5 (2)).

Reclamation measures range from complete restoration and return to approximate original contour to making a site safe and ecologically stable.

8. On page 2 of your statement you mention administrative problems and questions about access provisions for which the Forest Service is drafting revisions to regulations. What are these problems and questions?

The main problem or questions occur in the areas of residential occupancy on claims, compliance with State laws, bonding procedures and permitting access outside claim boundaries. In a revision of Forest Service regulations at 36 CFR 228, Subpart A, we are considering the following changes:

Residential Occupancy -- New regulations to clearly recognize that residential occupancy is only necessary in unusual circumstances and must be fully justified by the mineral operator. Current regulations are silent in this area.

Compliance with State Laws -- New regulations to specify when the Forest Service requires compliance with State environmental laws. Current regulations imply compliance is required with all State environmental laws.

Access -- New regulations to recognize the current practice of authorizing all operations, including access, through the plan of operation. Past practice was to authorize off-claim access through special use permits.

9. What authority does the Forest Service have to require modification in a plan of operations to protect the environment or the multiple-use values. For instance, can the Forest Service preclude an operator from using surface mining methods if the ore can be extracted using deep mining technology? Please provide examples of plans of operations changed at the Forest Service's request to protect environmental values or other multiple-use values.

The Forest Service has the authority to require reasonable measures to minimize adverse environmental impacts on the surface resources of National Forest System lands. In determining the reasonableness of required measures, economics of the operation must be considered along with other factors. In addition to taking reasonable measures for surface resource protection, the mineral operator must meet the requirements of many environmental laws covering such things as water and air quality and threatened or endangered species.

It is technically possible to have a case where it would be reasonable or legally necessary to require a change from surface mining to deep mining. We are, however, not aware of any case where this has actually happened.

Almost all proposed plans of operation undergo modification during both planning and operational stages to protect surface resource values and to meet legal requirements for environmental protection. Following are examples of changes to plans of operation to protect other resource values:

Troy Mine (Montana)--Helicopter procedures and schedules were changed to reduce adverse effects on grizzly bears.

Austin Gold Venture (Nevada)--Requirements were changed from angle of repose dumps with no revegetation to hard rock facing on the dumps; 3/1 sloping of the dumps; top-soiling and reseeding of the dumps; and construction of sediment traps and ponds below the dumps.

Huston Minerals (Idaho)--A track-mounted drill was used in lieu of a truck-mounted drill. This eliminated the need for 6 miles of road construction.

10. How many mines have been successfully reclaimed by the operator since the surface management regulations went into effect?

Audits by the General Accounting Office and our own formal reviews and other field visits indicate that we have successfully reclaimed the areas disturbed by mining activity covered by the regulations except for those areas where work is in progress or recently disturbed areas where reclamation is scheduled, but not yet initiated and/or completed.

Our records do not include the number of individual mine sites reclaimed. For 1989, they show that mine activity took place at sites covered by 3,634 plans of operation. This included 1,209 producing mine sites.

11. How many sites are considered to be in "inactive" status? What reclamation obligations exist for "inactive" mines?

We have not defined and do not track mining sites by an activity status. Activity is highly variable, ranging from essentially continuous operations to some long-term shut downs. Short-term and seasonal shut-downs are not uncommon. An "inactive" mine has the same reclamation responsibilities as an "active" mine. When a shut down not already covered in the plan of operation and included reclamation plan occurs, the plans are revised to include interim reclamation measures and to change the timing of final reclamation measures. In the event of a long-term shut down, we can make the decision to proceed to final reclamation. The operator can, of course, contest the reasonableness of that decision. In any event, the site and the surrounding areas must be protected from environmental degradation.

12. According to a quote by an official of Homestate Mining, it used to be common practice to discharge tailings into the local creek (Sacramento Bee article 3/18/90, p. A10). How are tailings disposal areas designed and reclaimed today? Are liners required?

Tailings are generally disposed of in surface embankments or impoundments. These are designed to ensure long-term stability from mass movement and wind and water erosion, and to prevent any short- or long-term toxic drainage. Liners are commonly required to control drainage when the tailings still contain water.

On some underground operations, tailings are being placed back in mined out areas.

13. Last March, the Forest Service testified before the House Mining Subcommittee on the subjects of reclamation and bonding. At that time, Associate Deputy Chief Unger stated that the Forest Service had completed a review of reclamation activities on national forest lands and had initiated the following actions: 1) Add a chapter to the Forest Service manual dealing with reclamation; 2) Provide training in the use and calculation of financial guarantees; 3) Establish standards for reviewing and updating financial guarantees; 4) Review procedures for the use of financial guarantees. What is the current status of these initiatives?

The chapter on reclamation was added to the Forest Service Manual in August of 1989.

Training on financial guarantees has been included in two major National Training courses for the last 3 years and is continuing. These courses are held annually and have involved several hundred people. The training material has gone to our field units for use as reference material and for use in local training sessions.

The standards and procedures for using, reviewing, and updating financial guarantees are included in both the training and Forest Service Manual discussed above.

14. What standards are used to determine reclamation success? How long are bonds held past reclamation to ensure reclamation is successful? Is this adequate? How is it decided what the post-mining land use of a mining operation will be?

Our policy is to establish measurable performance standard for reclamation in the plan for each site. Key elements are revegetation, soil and water quality measures, mass stability of waste and tailings embankments, concurrent reclamation, and post mining land configuration.

Bonds are held long enough to determine that measures are effective over time. This can often be determined in 1 to 3 years, but in difficult circumstances, it can take several more years. The time the bond is held should be established on a site-by-site basis -- not by statute.

We determine post-mining land use in the Forest Planning Process. This may be refined or modified in the project planning and could result in the need to modify the Forest Plan. Post-mining land use ranges from merely establishing a safe ecological condition through full restoration or a complete change in land use (such as a pond or scenic over look).

15. According to the U.S. Environmental Protection Agency, mining wastes pile up at a rate of 30 billion ton a year (Sacramento Bee, 3/18/90, p. A10). What reclamation standards does the Forest Service use to deal with mining waste piles that may contain toxic substances or heavy metals?

The Forest Service requires that waste piles containing toxic substance and heavy metals be located and treated in a manner that prevents air or water from moving toxic substances or heavy metals from the pile. This involves using soil or rock coverings, revegetation, and water drainage control.

16. What are the procedures for handling amendments to an operating plan? Are they uniform? Is there opportunity for public involvement?

An amendment to an operating plan may be proposed by the operator or at the request of the Forest Service to correct unforeseen environmental effects. The process, which involves compliance with the requirements of the National Environmental Policy Act, are uniform and well-established. The procedure requires that the public be informed and given the opportunity to participate.

17. Will angle-of-repose slopes be permitted in mining plans? Will they be left at angle-of-repose? What if they cannot be revegetated?

In some cases angle-of-repose dumps provide a safe and stable environmental condition and meet needed reclamation standards. When angle-of-repose dumps are permitted usually only revegetation of the top of the dumps is possible and planned for. Revegetation of dump slopes is only consistently possible using 3/1 (33-1/3 percent) slopes.

18. When the Forest Service considers preparing an Environmental Impact Statement (EIS) for a mine, does it take cumulative effect of adjacent mining on patented land into account?

Yes, all effects, regardless of their sources, must be considered in approving a plan of operations.

19. Please provide the following, broken down by State: the number of active heap leach operations on Forest Service lands; the number of inactive heap leach operations on Forest Service lands; the number of active vat leach operations on Forest Service lands; the number of inactive vat leach operations on Forest Service lands.

Listed below are the number of leaching mines on National Forest lands in 1989. It includes those that are in place or are approved for construction. We do not define or track mines by active or inactive status.

State	Total	Heap	Vat
California	3	2	1
Nevada	10	9	1
Idaho	4	3	1
Arizona	13	12	1
Montana	4	4	0

20. What is done today, or what can be done, to prevent an open pit from becoming a future superfund site, as is the Berkley pit in Montana?

The principal that must be used tc avoid toxic mine drainage is to prevent it from forming. This requires controlling air and water contact and movement on and through exposed mine surface, dumps, and tailing embankments that contain toxic components.

In a pit of the size, type, configuration, and other characteristics of the Berkley, it is probably not possible to prevent toxic mine drainage. At this point in time, water treatment is probably the only solution and would likely have to be done for years. This is expensive. Although some new techniques involving constructed wet lands or microbiology may help reduce costs.

21. Do reclamation experts in the industry, agencies, and general public have any organized way to share information regarding reclamation technology? Is there an electronic data bank available on existing technology--successes and failures--or are companies and land managers and interested citizens reinventing the wheel every time a new mining project comes up? Can the Federal Government assist in developing a technology transfer computer network?

There are numerous and effective ways that reclamation information is shared, and the need to "reinvent the wheel" should be the exception and not the rule. Most research and application testing results have been documented by State, Federal, or University researchers and entered into data bases which are available to anyone at little or no cost. The Forest Service and the Department of Agriculture both have extensive data bases and are interconnected with other data bases. There are several professional societies that deal either exclusively with reclamation or have formal working groups that do so. Examples are: the American Society for Surface Mining and Reclamation, the Society of American Foresters, and the Society for Range Management. There is still room for improvement in technology transfer. We are analyzing a proposal to develop an expert systems computer application to capture and use the reclamation knowledge that our reclamation experts have developed. We have not yet made a final determination on the feasibility of this proposal.

22. What is the objective of a reclamation bond for a mining operation. What is it intended to cover in terms of the cost of reclamation? To what extent do current bonds take into account potential water reclamation needs resulting from mining operations? Does the calculation of the bond amount assume that a third part contractor will perform the reclamation work if the operator fails to do so? How does the authorizing officer determine if a bond is required? What is the default rate of bonding? For how many abandoned operations (by number and as a percentage of total) was the bond amount insufficient? Please provide a list by state for each of the past 10 years the amount of federal or state money used to reclaim hardrock mining operations on BLM land, and the number of acres reclaimed.

The objective of the bond is to cover the cost to the Government of accomplishing all reclamation made necessary by mining operations. The amount of the bond is based on the actual cost to the Forest Service of performing the reclamation by force account or through an independent contractor. The authorizing officer requires a bond whenever there is a need for reclamation.

Where the cost of administering a bond exceeds the estimated cost of the reclamation, the authorizing officer may waive the bonding requirement. Our default rate has been very low. We estimate fewer than 25 instances in the last 2 years. We are not aware of any cases where the bond amounts were significantly less than the cost of the work.

The Forest Service has not collected data covering past expenditures on abandoned mine lands. We estimate that we will spend 5.9 million this fiscal year in assessing, inventorying, and reclaiming abandoned mine sites on National Forest System lands under the Federal facilities Compliance Program through the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

STATE OF COLORADO ROY ROMER, Governor
DEPARTMENT OF NATURAL RESOURCES
HAMLET J. BARRY III, Executive Director
1313 Sherman St, Room 718, Denver, Colorado 80203 866-3311

Geological Survey
Board of Land Commissioners
Mined Land Reclamation
Division of Mines
Oil and Gas Conservation Commission
Division of Parks & Outdoor Recreation
Soil Conservation Board
Water Conservation Board
Division of Water Resources
Division of Wildlife

May 3, 1990

The Honorable Jeff Bingaman
Chairman, Subcommittee on Mineral Resources
Development and Production
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510-6150

Dear Senator Bingaman:

Thank you for providing me the opportunity to testify before your subcommittee. I hope I provided you with useful information.

Attached is my response to the follow-up questions that you sent to me. I have kept the responses brief, however, I would be happy to respond in more detail at a later time if you so desire.

If you have further questions as you pursue this issue, please do not hesitate to call me.

Sincerely,

Ham B Barry

HAMLET J. BARRY III
Executive Director

0525A

1. a. __Question__: Does the mining industry use state-of-the-art technologies or practices at every operation?

__Response__: The Colorado mining industry uses practices that were approved at the time of permitting and that were determined to be necessary to meet the performance standards set by the state. Some of these practices are state-of-the-art, or were state-of-the-art when the permit was granted.

b. __Question__: Does Colorado require the use of state-of-the-art technologies?

__Response__: No, not as such. Use of state-of-the-art technology is not specifically required under state laws. The objective of an operator is to meet performance standards. The concept employed by the state is to require the use of the appropriate technology to achieve the required performance.

c. __Question:__ What are the state-of-the-art technologies for preventing acid mine drainage?

d. __Question__: Are these technologies or practices required in every case where acid mine drainage is a potential problem? If not, why not?

__Response:__ There are different methods and technologies available for preventing acid mine drainage depending upon the site characteristics. They generally fall in three categories; source treatment and isolation, active treatment systems and passive treatment systems. Source treatment and isolation is where waste piles that have the potential to be acid-forming are located out of drainage systems and isolated by using liners and caps to prevent water from coming in contact with the material. Plugging of portals is another method for reducing the migration of acid waters. Active treatment is the adding of lime or other neutralizing agent to the water to increase the pH, i.e. lime precipitators, lime feeders, etc. Passive treatment is where acid drainage is directed through artificial wetlands, or biological processes are employed to remove heavy metals. Passive treatment is not really focused upon acid reduction as much as it focuses upon removal of metals from the water.

The technology employed is that which is appropriate for each site. State law requires that drainages be protected from acid-forming and toxic-producing materials. Further, performance standards for discharge of water requires neutralization of pH. The principle method for controlling acid drainage is to remove the source. Active treatment is used at all sites that discharge water that could be acidic, with few exceptions. The few exceptions are where passive treatment systems are being tried. Passive treatment is still undergoing considerable experimentation.

2. Question: What is done today, or can be done, to prevent an open pit mine from becoming a future Superfund site, like the Berkley pit in Montana?

   Response: Considerably more mine planning is done today than occurred during the era that gave us Superfund sites. First, more baseline data is collected which describes the environmental characteristics of the area to be mined. This data is used to develop a mine plan where the adverse environmental effects that can occur during mining can be controlled and prevented. Second, greater attention is given to reclamation today. Topsoil salvage, revegetation, final grading, stream reestablishment and many other elements that determine the characteristics of the post-mining environment are evaluated to ensure that the land is reclaimed. In Colorado, a large mine operator has to provide sufficient warranty to guarantee that the plan can be achieved. The key to preventing a situation like the Berkley is effective planning which occurs under the mining and reclamation laws and the water quality laws.

3. Question: What are the environmental costs and benefits of backfilling large open pits?

   Response: Backfilling large open pits could result in environmental benefits. Whether a benefit would result is site dependent. In some cases it could improve drainage of water from the area which could reduce water pollution. In some cases it could result in an environmental cost where placement of acid-forming and toxic-producing materials in the pit may be more detrimental to water quality than placement in an area outside the pit. Colorado has encouraged the backfilling of pits where feasible and where environmental benefits would result.

   Whether pits should be required to be backfilled is a very complex issue. Backfilling pits can be extremely expensive. Requiring the backfilling of pits in every case may not be feasible. Removal of many minerals is unlike coal mining where overburden is removed to mine a seam of coal and then replaced in the pit. The nature of the mining method depends upon the characteristics of a particular ore body. Recovery of minerals usually does not allow for concurrent mining and overburden replacement. Thus, the backfilling of a mineral mine pit most often would require double handling of the material, which is what increases the cost of the operation. Issues associated with backfilling of non-coal mines are discussed in the 1979 study conducted by the National Academy of Sciences titled, Surface Mining of Non-Coal Minerals - A study of Mineral Mining from the Perspective of the Surface Mining Control and Reclamation Act of 1977.

4. Question: Do you believe phased bonding would be effective in assisting operators in obtaining bonds and in assuring reclamation?

   Response: Phased bonding is practiced in Colorado and is an effective way to reduce bond costs while assuring reclamation.

5. Question: In your testimony you stated some community concerns are warranted regarding cyanide use in mining operations where such operations have been poorly executed and maintained. Do you have specific examples?

   Response: In the mid-1970's a cyanide spill occurred in the Rito Seco drainage near San Luis, Colorado. The spill resulted in a fish kill and contaminated the area around the site. Recently during the permitting of a new operation in the same area by a different operator, citizens expressed considerable concern about allowing the development of another cyanide operation given the previous experience. This pressured the operator to commit to numerous assurances to prevent the recurrence of such an incident. Another operation in Colorado met difficulty when attempting to execute its plan during the winter at a high altitude site. The result was that greater volumes of water passed through the system than anticipated in the plan. The remedy required installation of a high volume pump system to capture water and return it to the system.

6. Question: I understand that the mining industry would prefer that federal and state reclamation requirements be expressed as "performance standards" rather than "design criteria". Please elaborate on the differences between these two approaches. How would you characterize the approach taken by Colorado's regulatory programs?

   Response: Performance standards establish a standard, usually numeric, that an operator must not exceed, as in the case of water, or must meet, as in the case of stability requirements for fills. A performance standard based program allows for flexibility in the use of technology and design to meet the standard. Given regional environmental differences and the diversity of mining operations, this is a most effective way to ensure environmental protection and reclamation.

   Design criteria identify what elements must be included in the design of a structure, system or facility to ensure a performance. For example, a system for controlling water runoff from a mine site may need to be designed to carry the peak flow from a precipitation event with a 10-year recurrent interval. A relationship between performance standards and design criteria occurs where structures must be in compliance within the range of events that it was designed to handle. As in the case of controlling runoff, a performance standard must be met for all precipitation events with a recurrence interval of 10 years or less. The system would not have to meet the performance standards for a larger event.

   Further, operators are concerned about specific national or statewide requirements that specify how a structure must be built. This can be very restrictive and result in inappropriate and costly designs for some sites.

   Colorado's programs are a combination of performance standards and design criteria. Performance standards, however, are the base for the mining and reclamation programs.

7. Question: In your experience, does the Bureau of Land Management standard of "no unnecessary or undue degradation", and the Forest Service standard "to minimize adverse environmental impact", as applied by these agencies provide a sufficient amount of environmental protection? Do the standards need to be tightened or their enforcement?

Response: The Colorado laws are applied on a statewide basis. The state requires permits and takes enforcement actions on Federal lands. Tightening the environmental standards of the Bureau of Land Management or the Forest Service that apply to mining is probably not necessary given the application of Colorado reclamation law to federal sites. We express no opinion as to wisdom or sufficiency of the Bureau of Land Management or Forest Service standard in states without a reclamation law, or in instances where the federal standard is the only standard applied.

As far as enforcement is concerned, Colorado needs additional manpower and resources to fully enforce state reclamation laws on federal lands. These costs to the state are borne solely by the state, and a direct federal contribution to enforcement should be considered.

8. Question: Do reclamation experts in the industry, agencies and general public have any organized way to share information regarding reclamation technology? Is there an electronic data bank available on existing technology -- successes and failures -- or are companies and land managers and interested citizens reinventing the wheel every time a new mining project comes up? Can the Federal government assist in developing a technology transfer computer network?

Response: There is existing information available at state and federal agencies to assist people in planning and assessing mining projects. Professionals in the field know about these sources. The sources include the Bureau of Mines, U.S. Geological Survey, Soil Conservation Service, Bureau of Land Management, Colorado Geological Survey, Colorado Mined Land Reclamation Division and others. Not withstanding these existing sources, the Federal Government may be able to assist technology transfer through development of a computer network. Existing computer network capability of the agencies identified above should be examined first, however.

FRB/eas

0525A

NEWMONT MINING CORPORATION
ONE UNITED BANK CENTER
1700 LINCOLN STREET
DENVER, COLORADO 80203
(303) 863-7414

May 3, 1990

The Honorable Jeff Bingaman
Chairman
Subcommittee on Mineral Resources
  Development and Production
Committee on Energy and Natural Resources
U.S. Senate
Washington, D.C. 20510

Dear Senator Bingaman:

Attached herewith are my responses to your questions of April 24 relating to the April 19 subcommittee hearing on reclamation and bonding practices associated with hard rock mining.

I appreciate the opportunity to provide additional information to the Committee. Unfortunately, the deadline for the closure of the hearing record did not allow sufficient opportunity for more comprehensive responses to such complex technical questions.

Sincerely,

Marcel F. DeGuire
Vice President
Environmental Affairs

MFD:po

Attachment

RESPONSES TO QUESTIONS FOR THE RECORD
SENATOR BUMPERS
MARCEL F. DEGUIRE, NEWMONT GOLD COMPANY
HEARING ON
RECLAMATION AND BONDING PRACTICES ASSOCIATED WITH HARD ROCK MINING ON FEDERAL AND STATE LANDS

1. **Does the mining industry use state-of-the-art technologies or practices at every operation?**

   - **If not, why?**
   - **What are the state-of-the-art technologies for preventing acid mine drainage?**
   - **Are these technologies or practices used in every case where acid mine drainage is a potential problem? If not, why not?**

Most mining operations employ state-of-the-art mining and production technologies as appropriate for their site-specific circumstances. However, mineralogy, topography, meteorology and other site-specific factors will determine what techniques are selected. Similarly, most facilities use state-of-the-art practices for environmental protection, subject to site-specific constraints and as necessary to protect human health and the environment.

State-of-the-art technologies for control of acidic waters at mining operations vary with the source of such waters. Typically, acidic water may be formed as acid mine drainage from underground mines, acidic pit water in open pits, or a seepage from waste rock dumps. If acid mine drainage cannot be prevented, it must be managed through treatment and discharge under Clean Water Act regulations.

Acidic water emanating from a sulfidic waste rock dump may be controlled by techniques which minimize contact with meteoric waters. In arid regions, diversion of run-on from the upgradient watershed may effectively limit the formation of acid and its potential to impact human health and the environment.

Waste rock may also be blended so that sulfide minerals are mixed with neutralizing materials. A variation of this technique is to "encapsulate" a sulfide waste rock dump in basic rock with neutralizing capabilities.

Recently there has been some work conducted on the use of bactericides for prevention of acid mine drainage. However, most of this work has been conducted on coal refuse piles and its utility in hard rock mining has yet to be determined.

Current design of new facilities does address and use these technologies for the prevention of acid mine drainage. The State of Nevada requires that all new facilities determine the potential for acid mine drainage and incorporate methods for reducing, eliminating, or otherwise managing it in their design. Where acid mine drainage currently poses the potential to degrade water quality, existing facilities must develop appropriate corrective measures for dealing with the problem.

2. **What is done today, or can be done today, to prevent open pit mines from becoming a future Superfund site like the Berkeley pit in Montana?**

Detailed planning and design of new open pits, focusing on potential environmental degradation is the primary means for preventing a site from becoming a Superfund site.

Not all open pits pose risks to human health and the environment. In cases where risk is present, the extent of the risk depends on numerous site-specific conditions, including mineralogy, hydrology, geology, topography and climate. Mines that do not penetrate the water table are nothing more than large holes in the ground. Protection of public safety is generally the only issue to be faced upon closure, and this can be addressed through limitations on public access or institutional controls.

Pits that do penetrate the water table do not necessarily degrade water quality. In order for mine waters to turn acidic, two conditions must exist. First, the amount of sulfide minerals present must exceed the rock's neutralizing capacity. Second, the rock must be exposed to both air and water. (Some people are also of the opinion that bacteria must be present.) If either of these conditions are not met, water quality will generally not be degraded. However, if acidic mine water is formed, there must be a potential to impact human or other biological receptors in order for it to present a risk to human health or environment.

It is generally infeasible to effectively seal a pit wall and preclude either inflow of groundwater or the oxidation of sulfide materials. The sheer scale of large open pits, their geology and their extreme topography all act to limit the effectiveness of this option. Treatment of the water within a pit by addition of limestone or other such material would be economically practicable for only the smallest mines. Backfilling with other than neutralizing material would have no positive effect on water quality and in fact could cause greater degradation. Since the prevention of acid formation and in-pit treatment of acidic waters are generally infeasible, site-specific management techniques must be utilized to prevent degraded water from migrating from the pit and impacting human health or the environment. This may involve removal, treatment and discharge of pit waters so that the water level remains below some critical elevation. If natural geologic and hydrologic conditions do not prevent migration of acidic water from the pit into the surrounding aquifer, then some form of subsurface management will be required. These include pump-back systems, barrier walls, combinations of these, or other such techniques.

3. **What are the environmental costs and benefits of backfilling large open pits?**

Backfilling of open pit mines in the hard rock mining industry is an extremely rare practice, chiefly due to economic factors. Since metallic ores are not usually found in the layer-type deposits common in coal mining, an entire ore deposit must be exhausted before a pit can be filled in. In addition to the doubling of materials handling costs for millions of tons of rock, there are a number of environmental costs that in most cases greatly outweighs any environmental benefits that may be gained from backfilling.

Moving millions of tons of rock causes fugitive emissions of particulate matter. Generally speaking, fugitive dust generated by excavation within an open pit settles out in the pit rather than being transported off-site. This is particularly true as the depth of the excavation increases. However, if this material has been placed on a waste rock dump and then must be picked up and moved a second time for return to the pit, fugitive dust will be emitted into the airshed, with the potential for off-site transport. Doubling the handling of materials also doubles the amount of fossil fuel consumption and emissions from the heavy equipment necessary to return waste rock to the open pit. The time factor involved in backfilling a pit would be lengthy. If it took 20-30 years to mine the pit, it would likewise take a similar amount of time to backfill it.

4. **In your experience, does the Bureau of Land Management standard of "no unnecessary or undue degradation" and the Forest Service standard "to minimize adverse environmental impact," as applied by these agencies provide a sufficient amount of environmental protection? Do the standards need to be tightened or their enforcement?**

In general terms, these types of standards are appropriate because they allow the degree of flexibility necessary to address the site-specific circumstances encountered at each mine site. The concept of "unnecessary degradation" is especially important to the mining industry. The BLM's regulation therefore recognizes some degradation, specifically disruption of the land surface, is inevitable and therefore necessary in order to recover minerals from the earth.

The use of such general standards also allows the federal land management agencies to defer to existing state and federal laws and regulations for protection of air, surface and ground water quality. This avoids the potential for conflicting or duplicative requirements that would exist if these agencies had their own specific requirements regarding facility design, monitoring, etc.

State and federal control over potential impacts from mining will become more complete and comprehensive as EPA's regulations for mine waste management are developed under Subtitle D of the Resource Conservation and Recovery Act, further reducing the need for BLM or Forest Service requirements. The RCRA rules will apply to operations on public as well as private land, and will provide the federal land management agencies with clear guidelines on the performance standards that must be met to protect human health and the environment.

5. **Do you believe phased bonding would be effective in assisting operators in obtaining bonds and in assuring reclamation?**

Phased or "incremental" bonding is definitely desirable. Most, if not all mining operations initiate mine development before their orebody is fully delineated. It is therefore impossible for most facilities to exactly predict the true value of their reserves or the final extent of their land disturbances. Phased bonding allows an operator to base his reclamation planning on what he knows will exist, both in terms of financial resources and lands requiring reclamation. By proceeding in stages, the operator must provide a bond only for that area he anticipates on disturbing in the near future. When an increased surface disturbance becomes necessary, the operator may be able to reclaim some of the previous disturbance, thereby limiting the amount of additional capital required for the next "phase" of bonding. Alternately, the operator may have further delineated the orebody to prove additional reserve, which may facilitate the bonding procedure.

Phased bonding can also help assure that reclamation will be done. By limiting the amount of acreage disturbed during any one phase, it allows for timely inspections. If the operator is not adhering to permit requirements, no further disturbance could be authorized until permit conditions are met.

The option of providing "phased" or "incremental" financial assurance to ensure that reclamation is completed is part of the Nevada reclamation regulations. During development of these regulations, all interested parties, including the State Division of Environmental Protection, the State Department of Minerals, the Bureau of Land Management, the Forest Service, the mining industry and the Sierra Club, all agreed that such an option was beneficial. Operators who select this option will be issued permits that specify the extent of disturbance allowed under each "phase" or "increment" of surety.

6. **I understand that the mining industry would prefer that federal and state reclamation requirements be expressed as "performance standards" rather than "design criteria." Can you elaborate on the differences between these two approaches, and provide specific examples? How would you characterize the approach taken by the federal and state regulatory programs?**

"Performance standards" specify the final outcome required by a reclamation requirement, while "design criteria" specify the manner in which this outcome must be achieved. As an example, the Nevada reclamation regulations require that, in general, disturbed lands be reclaimed to a stability and resistance to erosion that is comparable to that which existed prior to mining or which exists on adjacent land. The measures necessary to achieve the "performance standard" are left to the operator's discretion subject to state approval. Among other options, the operator may establish a density of vegetation sufficient for this purpose, modify the slopes to enhance stability, or control run-on.

The obvious advantage of performance standards is that they do not prejudge all situations and require identical solutions regardless of how a potential problem is manifested at a given site. Limiting run-on may be appropriate when the upgradient watershed is large and the velocity is such that erosion cannot be prevented through vegetative cover. In other circumstances, limiting run-on may seriously hamper revegetation efforts. The operator generally has the best appreciation for site-specific factors involved in reclamation; performance standards allow him to use this information to his best economic advantage yet still achieve the necessary results.

Large-scale earthworks such as mined land reclamation are too dependent of specifics of topography, geology and climate to be made subject to uniform design criteria. In general, most state and federal agencies recognize this fact, and apply general performance standards rather than specific requirements to hard rock reclamation.

7. **What is the usual proportion of gross mine revenue to the reclamation expenditures which the Bureau of Land Management or the Forest Service demand?**

No direct relationship exists between the amount of gross revenue a mine will realize and its costs for reclamation. While such a proportion can be calculated after the fact, revenue and reclamation costs are related only in the broadest sense. While it may be generally true that larger mines generate greater revenue, create larger surface disturbances and therefore have higher reclamation costs than smaller mines, this is not always the case.

The gross revenue a mine generates is determined by its production and the selling price of the commodity mined. While this appears to be straightforward, it must be noted that prices for metal fluctuate on an international market over which the operator has no control. Production levels are related to selling price because ore is mined only if it can be processed into metal and sold at a profit. Therefore, ore reserves change over time and gross revenues can be accurately determined only after mining has ceased.

Reclamation costs are dependent on such variables as mine type, ore grade, topography and environmental factors. For example, an underground operation mining high grade ore will create less surface disturbance than an open pit mine handling low grade ore. The underground mine has no overburden and little waste rock and recovers more of its ore as product, while the open pit mine generates large quantities of overburden and waste rock. The depth and configuration of the orebody also affects reclamation costs, as two open pits will vary in the amounts of waste rock and overburden they must generate in order to extract their ore.

Topography and environment also play important parts in determining reclamation costs. Steep terrain is more difficult and costly to reclaim than flat land. Topography also affects the size of mining disturbances because it determines the physical configurations of tailings ponds and waste rock dumps. Costs for revegetation vary depending on the type of vegetation to be established and climatic conditions.

8. **Do reclamation experts in the industry, agencies and general public have any organized way to share information regarding reclamation technology? Is there an electronic data bank available on existing technology - successes and failures - or are companies reinventing the wheel every time a new mining project comes up? Can the Federal Government assist in developing a technology transfer computer network?**

The primary way in which information on reclamation is shared is through conferences and technical symposiums held periodically by various educational and professional organizations. For example, in March of 1989, a conference entitle "Bringing Back the Land, Mining Reclamation in the Arid West," was held at the University of Nevada at Reno (UNR). In addition to UNR's MacKay School of Mines, College of Agriculture and Environmental Studies Board, conference co-sponsors included the Mineral Policy Center, the Nevada Mining Association and the Sierra Club. "Presentations addressed philosophy planning procedures, and post-mining land uses, as well as reclamation implementation and case studies, bonding and other financial surety methods, and the economics of reclamation.

The University of Nevada at Reno hosts a Generic Waste Center, funded by the U.S. Bureau of Mines, which maintains a library dealing with environmental papers, books, etc., on mining wastes. The existence of this library is not generally known throughout the industry. The library is under funded, as is the Generic Waste Center itself. This group funds research on recovery, utilization and environmental aspects of mining wastes. The 31 mineral institutes in the U.S. are able to participate in this program.

To Newmont's knowledge, no electronic data base currently exists. State reclamation agencies and federal land management agencies are some of the best sources of this information because they operate in specific regions of the country where operators face similar environmental constraints. The federal government would provide a valuable service if it were to develop a system of computerized technology transfer regarding information on such topics as which vegetative species are most resistant to drought, extreme heat and cold, and high salt content. The UNR's Generic Waste Center library would be an appropriate starting point for such a data base.

Marcel F. DeGuire
Vice President
Environmental Affairs
Newmont Gold Company
1700 Lincoln Street
Denver, CO 80203

PEGASUS GOLD
CORPORATION
Pride in Action!

May 3, 1990

Senator Jeff Bingaman
Subcommitte Chairman
Senate Energy and Natural/Resources Committee
Dirksen Office Building
Washington, D.C. 20510

Dear Senator Bingaman:

Enclosed please find responses to eight supplementary questions sent to me by Senator Bumpers. Please include them in the subcommittee's Hearing record.

Thank you.

John S. Fitzpatrick
Director
Community and Governmental Affairs

JSF/brq

Responses to
Questions for the Record
Senator Bumpers
John S. Fitzpatrick
Hearing on
Reclamation and bonding Practices Associated with Hard Rock Mining on Federal and State Lands

1. Question: Does the mining industry use state-of-the-art technologies or practices at every operation?

   - If not, why?
   - Let's use acid mine drainage for example. What are the state-of-the-art technologies for preventing acid mine drainage?
   - Are these technologies or practices used in every case where acid mine drainage is a potential problem? If not, why not?

Response: The question as phrased is very broad since it presumably seeks information on the status of every mine in the United States. As the employee and representative of one company, Pegasus Gold Corporation, it is clearly impossible for me to speak definitely about mining operations owned and managed by other firms. Nevertheless, I will attempt to broadly answer Senator Bumpers question, as follows:

The mining industry is no different from any other industrial sector in this country. It involves a variety of individuals and firms that vary, among other things, in size, capital structure, financial success, and technological complexity. No industry, even the most modern, such as the manufacturing of computer chips, is fully composed of entities employing state-of-the-art technology. To be fully "state-of-the-art" would require the complete recapitalization and rebuilding of the firm every few years, if not months, a condition that is logistically and financially impossible.

In the mining industry, the application of state-of-the-art technology appears to be primarily a function of:

1. The age of the mining facility. Newer mines are more state-of-the-art than older operations, although exceptions exist for older facilities that have been recently remodeled. The vast majority of operating gold mines in the United States have been opened since 1980 and generally employ technologies that are "state-of-the-art".

2. The profitability and capital structure of the company. State-of-the-art technology requires continuous capital investment because technology is constantly changing. Investment is made when there is an expectation of a return on the investment. As such, adoption of technological innovations is dependent upon the new technology being able to repay the investor. The adoption of the solvent extraction-electrowinning method for copper recovery and the expansion of cyanide heap leaching of gold are two examples where state-of-the-art technology has been employed, in part due to the opportunity to recoup the required capital investment.

3. The Regulatory Environment. Political systems establish both constraints and opportunities for businesses. For the past 10-20 years the regulatory environment for the mining industry has been, almost universally, of a constraining nature. This has taken place through environmental and safety legislation which has set forth specific limits on what operators may do. To meet those regulatory requirements the industry has made substantial investments in new technology. Examples of such investment include the development of sulfuric acid plants and scrubber systems at smelters to reduce SO_2 emissions, installation of water treatment plants to reduce heavy metals discharges, and ongoing reclamation programs to return disturbed land to productive use as soon as practical after mining.

Acid mine drainage can occur at both metal and coal mines. It is caused by the oxidation of sulphide minerals such as iron-pyrite, although not all sulphide minerals acidify. When the mineral is contacted by water dilute sulphuric acid is formed which, inturn, may dissolve or leach heavy metals from the mineral. Acid mine drainage does not occur at all mines; only those with sulphide mineralization in contact with sufficient air and water to generate leachate are potential acid producers. Acid mine drainage is primarily an environmental problem at abandoned mines.

Some technologies available for dealing with acid mine drainage include:

1. Installation of drainage and water diversion systems to prevent infiltration of water into acid generating material.

2. Sealing mine openings to stop or inhibit water flows.

3. Developing, where possible, free draining pits so water inflows do not pond and start the acidification process.

4. Capping acid generating materials with inert rock to prevent water infiltration.

5. Adding lime or another commercially available buffering agent to acid generating material to prevent the formation of acids or to neutralize it as it is produced.

6. Topsoiling and revegetating potentially acid generating materials, again, to inhibit water inflows and acid generation.

7. Treatment of acid laden waters to increase the pH and recover dissolved metals. As the pH rises, the acid content decreases and heavy metals are precipitated, expediting their recovery.

8. Flooding abandoned mine workings. In the absence of air (oxygen) acid generation proceeds slowly, if at all.

9. Adding a bactericide to inhibit the bacterial action that facilitates the formation of acid. A number of bacteria such as thiobacillus ferroxidans accerlates the oxidation of sulphide while partially consuming sulfur.

The techniques described above are widely used throughout today's mining industry. Acid mine drainage is not a widespread problem among major operating mines. As stated above, it is primarily associated with abandoned facilities, some of which were developed in the 1800's. The federal government's Abandoned Mine Reclamation program and similar programs such as those funded by Montana's Resource Indemnity Trust Tax have been systematically reclaiming coal mines and high hazard metal mines. In doing so, actual and potential problems with acid mine drainage are being reduced.

2. **Question**: What is done today, or can be done today, to prevent an open pit mine from becoming a future Superfund site, like the Berkeley pit in Montana?

Response: The Berkeley pit was opened in 1955, a full 12 years before the State of Montana began the process of regulating air and water quality and almost 20 years before it began permitting mines. Under the statutes and regulations currently in effect in Montana, the Berkeley Pit could not be developed as it was in the 1950's.

To develop a mine like the Berkeley Pit under Montana's current reclamation and water quality standards, the applicant company would need to prepare, at a minimum:

1. A plan showing how it would either stop and/or treat water flowing into the excavation. The plan would need

to cover both the operational period of the mine and the indefinite future after the mine closed.

2. A plan for the neutralization and/or isolation of acid generating mine waste to prevent acid formation.

3. A plan for the stabilization and reclamation of all waste dumps, mineral processing areas, roads, and utilities. The plan would call for the disturbed lands to be returned to a productive use comparable to adjacent lands.

According to the Montana EPA staff, the Berkeley pit in and of itself is not a superfund site. It is included within the larger Silver Bow Creek-Butte superfund designation based upon historic mining, milling, and smelting practice and because there is a large population (i.e. approximately 40,000 people) "at-risk".

If the Berkeley pit were not located in an urban area the likelihood of it being designated a superfund site would decrease substantially. Furthermore, if the pit were dry or contained only a small volume of water unlikely to contaminate the regional groundwater, the chance of it being designated a superfund site would again diminish. The Berkeley pit is filling with water primarily because Anaconda/ARCO made a decision to stop pumping water from its Butte mining complex, an action that ultimately raised the groundwater table and allowed water to enter the pit. Thus, had water control or treatment measures been built into the design and operation of the facility, as required under current law, it is very unlikely the Berkeley pit would be part of a Superfund site.

As Congress examines the issue of mine reclamation, it should not view the Berkeley pit as a typical example of either the environmental problems routinely associated with surface metal mining or mine reclamation. That facility is unique in many ways and does not constitute an accurate basis upon which to base future public policy decisions.

3. Question: What are the environmental costs and benefits of backfilling large open pits?

Response: There are three environmental effects or, costs, of large open pit mines that are consistently addressed in environmental analyses of such facilities, as follows:

1. Open pits are hazardous to man, domestic livestock, and wildlife, primarily from the threat of accidental falls.

2. Large open pits are unsightly and adversely affects the visual resource or scenic beauty of the landscape.

3. Open pits act as collection sumps for surface and ground water which become contaminated by acid generation and heavy metals which, in turn, may infiltrate into adjacent groundwater and surface water supplies.

Mitigating these concerns does not require backfilling pits. In the first case, hazard protection for man can be readily achieved with fencing and warning signs. Domestic livestock and wildlife routinely deal with steep slopes, rock slides, talus slopes, and cliffs in the natural environment and are not at risk from open pit excavations.

Second, while it is generally conceded that open pits are unsightly, the actual effect on visual resources is very limited due primarily to the relatively few "large open pits" in the United States and their location in rural, if not remote, locations, where they are infrequently seen by small numbers of people. Furthermore, pit walls can be stabilized and benches vegetated to create cliff like environments and habitats.

Third, the potential for water contamination does not exist at all large open pits. Facilities located above the groundwater table, where the rate of evaporation exceeds the rate of water infiltration, and where the geology largely consists of non-sulfide bearing rock, are not apt to become a source of water contamination. Even when there is some potential for water contamination, there are a number of methods available to either inhibit and/or treat such flows so that the threat of water contamination is either reduced or eliminated.

Backfilling large open pits or reducing pit high walls are activities of immense economic consequence. Unfortunately, parties promoting the notion of backfilling refer to surface mine reclamation practices in the coal industry and either assume or advocate similar practices in surface metal mines. Nothing could be more inaccurate. Surface coal mines have geological characteristics and economic parameters that bear little relationship to surface metal mines. My testimony before the committee April 19, 1990, contains a succinct description of why open pit metal mines cannot and should not be backfilled. Critical to the issue of backfilling open pits is the economic cost it entails. Backfilling a structure like the Berkeley Pit would cost in excess of $1.0 billion, a rather substantial price for environmental effects that may not be particularly significant or, if significant, can be mitigated in other ways.

4. Question: In your experience, does the Bureau of Land Management standard of no "unnecessary or undue degradation", and the Forest Service standard "to minimize adverse environmental impact", as provided by these agencies provide

a sufficient amount of environmental protection? Do the statutory standards need to be tightened or their enforcement?

Response: The existing standards are sufficient to maintain and enhance the environment. From my experience, the BLM and USFS need to improve enforcement of existing statutes but do not need additional statutory authority. Both agencies suffer from a lack of resources to properly carry out their oversight and regulatory function. Most Forests and BLM District's have from one to three mineral staff officers to carry out the agency's statutory and regulatory responsibilities. In addition, many technical staff specialists in areas like wildlife, vegetation, or cultural resources, have little familiarity or experience with either mineral exploration or mining activities but, yet, are called upon to make environmental assessments of proposed mineral related activities.

If the federal government wishes to make a truly substantive improvement in the permitting, oversight, and reclamation of mineral related activities on public lands, the following actions are recommended.

1. Increase the operating budgets of the USFS and BLM to allow the agencies to hire more mineral staff officers.

2. Fund a training program that will provide for the systematic education of other resource specialists on matters related to mine development, operation, and reclamation.

3. Fund cooperative research efforts between the BLM, USFS, and Bureau of Mines to develop new approaches and solution to a range of issues. Mining takes place in a wide variety of specialized environments. Additional research would be useful to guide mine planning and reclamation in such settings. Examples of such topics include, reclamation in extremely arid or wet locations, reclamation of steep slopes, transplanting sensitive or rare species, and chemical detoxification, to mention just a few.

5. **Question**: Do you believe phased bonding would be effective in assisting operators in obtaining bonds and in assuring reclamation?

Response: The principal problems with bonding are:

1. Surety Bonds are not uniformly available. Small operations, in particular, find it difficult to obtain bonds.

2. **Surety Bonds, when available, may be to expensive for the operator to afford.**

When an operator cannot secure a conventional surety bond, bonds usually are posted by assignment of a certificate of deposit (CD) or other type of collateral with the regulatory agency. This approach may tie up significant amounts of an operator's cash and, hence, work a hardship on the firm.

Phased bonding is not as important in situations where the operator can secure a conventional surety bond. Phased bonding can be very helpful in situations where the operator must post a CD or other security to bond the operation. The phased approach allows the operator to lessen the amount of cash tied up in a bond while providing protection to the government by seeing that bond levels are adjusted along with the level of disturbance.

Some states such as Montana already used phased bonding. The federal government should consider it as well.

6. **Question**: I understand that the mining industry would prefer that federal and state reclamation requirements be expressed as "performance standards" rather than "design criteria". Can you elaborate on the differences between these two approaches, and provide specific examples? How would you characterize the approach taken by the federal and state regulatory programs?

   Response: In its simplest form, "performance standards" are the desired outcome or target that is to be obtained by some activity. The means used to obtain the preferred outcome are not specified and the operator is free to use the method or technology most suitable to his particular case. Common examples of "performance standards" are air and water quality standards that specify the maximum amount of a containment that can be released to the environment. The standards do not specify how the standards are to be achieved and, in fact, a number of methods can be are employed. For example, to meet air quality standards some utilities install scrubber systems on their stacks, others have converted to low sulphur coal, others have converted to oil and gas, and still others have used a combination of methods.

   "Design criteria" refers to specific parameters that must be incorporated in the design and construction of a facility. The design criteria are intended to insure that some type of goal or public policy objective is achieved. Common examples of the "design criteria" approach are building and fire codes. In such cases, a requirement such as the installation of sprinkler systems in buildings of a certain size are mandated and the operator must agree to the installation as a condition of receiving a permit.

The mining industry prefers the "performance standard" approach because it is inherently more flexible than the "design criteria" method. Mining takes place in a wide variety of environments using a broad range of technologies. Literally, no two mines are alike, there is no "average" mine. "Design criteria" that are perfectly suitable on flat lands in an arid environment such as central Nevada may be wholly inapplicable to mountainous and/or wet terrain in a place like northern Idaho. To be successful, environmental controls must reflect the variation inherent in the industry's operating environment. "Design criteria" do not achieve that end. Instead, it seeks assurance through standardization, an approach that is not feasible in diverse conditions.

7. **Question**: What is the usual proportion of gross mine revenue to the reclamation expenditures which the Bureau of Land Management of the Forest Service demand?

Response: The question as written is inappropriate. Gross mine revenue is a function of product sales and is not directly related to reclamation. Reclamation activities are capital and operating expenses. They increase the cost of doing business and constitute a deduction from net revenue or profit. Reclamation expenses must be viewed from the perspective of net, not gross revenue since, ultimately, the success of the mine and its reclamation requires a reasonable financial return.

The impact of reclamation costs on net profit is significant. For example, Pegasus' Beal Mountain Mine is currently bonded at $2,771,171, the estimated full cost of reclamation. In 1989, that mine contributed approximately $2.8 million to the corporation's net earnings of $9.8 million. Assuming similar profitability over the 10 year operating life of the mine, reclamation costs are equal to 9.9% of net income. At our Basin Creek Mine, projected reclamation costs of $2,049,000 constitutes 49% of the projected net profit of the mine over its remaining seven year life based upon the company's 1989 experience. Pegasus plans extensive capital investment at the facility between 1990 and 1992 with the intention of improving profitability. If successful, reclamation costs as a share of net profit will decline but it is unlikely they will decline below 10 percent of net revenue.

8. **Question**: Do reclamation experts in the industry, agencies and general public have any organized way to share information regarding reclamation technology? Is there an electronic data bank available on existing technology -- successes and failures - or are companies and land managers and interested citizens reinventing the wheel every time a new mining project comes up? Can the Federal Government assist in developing a technology transfer computer network?

Response: The principal problem in sharing information about mine reclamation is in its generation, not its dissemination. Many of the parties conducting reclamation work are mining companies, reclamation and/or engineering consultants, and contractors. These parties conduct reclamation as part of their business and, usually, do not establish, document, or implement their work plans with the intent of preparing scientific or professional papers on the subject. The results of such efforts including, perhaps, the development of innovative approaches are not recorded. My own company, Pegasus Gold, is an example. The firm has done work in the areas of neutralizing cyanide heap leaching facilities and reclaiming steep slopes with great success. Nevertheless, with the exception of some limited sharing of information with state and federal regulatory agencies, the results of those efforts have not been disseminated.

Once the material has been prepared, existing networks of information dissemention, be it through professional meetings, seminars, and/or bibliographic compilations, appears adequate to meet industry needs.

If Congress wishes to expand or improve the dissemination of information about mine reclamation, I recommend the following:

1. Fund a research and development effort within the BLM and USFS aimed at promoting cooperative research projects with industry. In that way, the agencies can participate in the design of reclamation studies, can provide the capacity to document and publish the results, and gain the benefit of conducting reclamation research in the field rather than under laboratory conditions. Pegasus Gold Corporation has proposed establishing a small scale effort of that type with the USFS and BLM at our Montana operations and we hope to be able to formally announce the development of such an effort later this year.

2. Make additional funds available to the Bureau of Mines for the development of a special information series directed specifically to mine reclamation issues. The Bureau has an excellent information network in place that is both widely respected and used by the mining industry. Enhancing the Bureau's capacity to publish and distribute mine reclamation materials would be the most effective means available.

JSF/brq

Northern Plains Resource Council

May 2, 1990

RESPONSE OF RICHARD PARKS TO QUESTIONS FOR THE RECORD SENATOR BUMPERS, HEARING ON RECLAMATION AND BONDING PRACTICES ASSOCIATED WITH HARD ROCK MINING ON FEDERAL AND STATE LANDS

1. Does the mining industry use state-of-the-art technologies or practices at every operation?
   * What are the state-of-the-art technologies for preventing acid mine drainage?
   * Are these technologies or practices required in every case where acid mine drainage is a potential problem?

We can safely assume that mining companies will usually use state-of-the-art technologies and practices to extract and process minerals. However, similar advanced technologies for reclamation of mining areas are not widely used. Even where the latest reclamation technology is used, environmental problems still arise.

State-of-the-art technology and practices for reclamation involve primarily earth moving that will lead to the re-establishment of vegetation on disturbed lands.

In Montana, the Department of State Lands regulates hard rock mining. In evaluating information from a mining company's proposed plan of operation, the agency looks for mineral characteristics that may lead to acid formation, such as the presence of sulfide bearing rock. Making this determination is not always easy. The decision depends entirely on information supplied by the mining company, as the agency does not have the personnel to do these studies. There have been cases where the state has done spot sampling of ore at mining operations and has obtained results that showed a greater potential for acid mine drainage than the mining company data had initially indicated.

In areas where the conditions (mineral zones containing sulfides) are favorable for acid mine drainage formation, little can be done to prevent the actual formation of acid mine drainage. In such cases, several reclamation practices can be used to reduce the likelihood that acid drainage will result.

Agencies try to mitigate acid formation from tailings impoundments and waste rock dumps by requiring several practices in reclamation plans. Impoundments and dumps can be capped with segregated soil and then revegetated. This technique hydrologically isolates the sulfide rock from oxygen and water, reducing the potential for acid formation.

Waste rock dumps can be capped with neutral waste rock to lessen the potential for acid formation, or lime can be added to the waste rock to neutralize acid formation. Although not always required by the state, reclamation plans should require

419 Stapleton Building Billings, MT 59101 (406) 248-1154

that dumps and impoundments be re-graded to slopes which facilitate revegetation attempts. Agency personnel have indicated to us that in some instances they have met with strong political resistance from mining companies in their attempts to require such reclamation procedures.

With underground mine shafts and adits, there are no reasonable reclamation techniques to prevent acid mine drainage. In these cases, the only mitigation is to perpetually treat the contaminated mine drainage. Serious consideration should be given as to whether such long-term clean-up costs and liabilities to the public are worth the short-term economic benefits to a company mining the ore. At a minimum, agencies should ensure that the company, and not the taxpayers, are held responsible for this perpetual treatment.

One industry proposal to mitigate acid drainage from mine shafts is to plug the mine portal. This practice may avoid the problem of the acid drainage temporarily. However, it could create serious problems in the future as the plug is eaten away by the acid waters behind it, and acid drainage seeps into adjoining surface and ground waters.

When acid mine drainage is caused by open pits, the only mitigation proposed in Montana is to perpetually treat the acid waters where it discharges into surface waters. However, this remedial approach does nothing to address the problem of groundwater contamination.

2. **What is done today, or can be done today, to prevent an open pit mine from becoming a future Superfund site, like the Berkeley pit in Montana?**

The only way this situation could have been prevented was if mining had not taken place in the pit in the first place. Perpetual treatment of the contaminated water is the only reclamation procedure that can be done today to prevent further contamination of the waters in the Berkeley pit. At the Berkeley pit, sulfide rock present in the pit, and in the many miles of mine tunnels emptying into it, has caused acid drainage that continues to pollute the water in the pit.

One step that could be taken to address this type of problem is to give agencies the discretion to deny mining permits based on unsuitability criteria that can fairly weigh the long term impacts of a potential Superfund site against the benefits of mining.

3. What are the environmental costs and benefits of backfilling large open pits?

Backfilling pits would be beneficial in that it would minimize surface run-off from a mine site. In cases where acid drainage potential exists, successful revegetation and backfilling might reduce contamination in surface runoff. However, groundwater contamination can still result if groundwater infiltrated the sulfide rock that would be in the backfill material and formed acid drainage. Backfilling would create an anaerobic situation in the backfilled material which would help prevent some formation of acid drainage by minimizing the presence of oxygen.

In situations where there is no potential for acid formation, backfilling may be the environmentally preferred reclamation procedure. This would at least partially restore scenic vistas. This is an important factor for mitigating the long-term adverse impacts to the recreational and tourist economies of the West, since the 1872 Mining law, unlike the federal Surface Mining Control and Reclamation Act, does not allow the agencies the discretion to prohibit mining based on "unsuitability criteria" such as proximity to national parks and monuments, and other visual resources.

4. In your experience, does the Bureau of Land Management standard of "no unnecessary or undue degradation", and the Forest Service standard "to minimize adverse environmental impact", as applied by these agencies provide a sufficient amount of environmental protection? Do the standards need to be tightened or their enforcement?

In our experience with these agencies, their standards for environmental protection in many cases do not provide a sufficient amount of environmental protection. We have found that the level of protection and the degree to which standards are enforced by agencies varies with the local personnel working at the permit level. The "standards", as posed in the question, are not specific and are subject to differing interpretations. They provide no basis for consistency in federal oversight of mining operations.

Even in cases where applicable standards were met, environmental protection was not accomplished. We feel that both enforcement and standards must be strengthened.

5. Do you think the initiatives that the Bureau of Land Management outlined in its testimony regarding increased inspections, personnel presence and funding will resolve the problems encountered in the Bureau of Land Management's surface management program?

Increased inspections, personnel presence and funding will help alleviate some problems in the BLM surface management program. However, we believe that a change in policy is needed to properly resolve problems with managing mining on public land. This would come from a reformed 1872 Mining Law. Agencies should be given the charge to evaluate all surface uses of public land and weigh these against mining, when deciding whether to permit a mining proposal. Strong reclamation and bonding requirements, incorporating appropriate design criteria to attain performance standards in perpetuity, should be the cornerstone of the federal regulatory program. A critical consideration for regulators must be protection of both underground and surface water resources.

Funding for regulatory and enforcement programs should come from royalties assessed to mine operators for the privilege of taking minerals from public land. The expense of regulatory programs from hard rock mining should be make a part of the cost of production, and not subsidized by the taxpayers as is effectively the case now under the 1872 Mining Law.

6. **Do you believe phased bonding would be effective in assisting operators in obtaining bonds and in assuring reclamation?**

The problem with bonding is not that bonds are too difficult to obtain. We see a substantial problem in the fact that bonds do not cover all the environmental threats, such as impacts to water resources, that directly result from mining.

Phased bonding can work at mines where the operations will incrementally move from one distinct area to another, as in the case of one open pit being played out and another one being developed in another area.

We believe that strong public participation provisions in the bond release process should be implemented. This will improve the thoroughness of review for determining whether reclamation efforts will succeed in the long-term.

7. **I understand that the mining industry would prefer that federal and state reclamation requirements be expressed as "performance standards" rather that "design criteria". Please explain the differences between these two approaches. How would you characterize the approach taken by the federal and state regulatory programs?**

In Montana, design criteria are used as the basis for setting the amount of a reclamation bond (i.e., the costs of certain reclamation jobs are compiled to arrive at a final bond amount). This typically involves identifying the construction procedures and their costs, that are needed to attain desired reclamation conditions, such as regraded rock dumps, and reseeding.

Performance standards are not considered in determining bond amounts. Should certain aspects of reclamation fail, and result in impacts to water quality or surface vegetation, there are no provisions to do any remedial action, further reclamation, or clean-up in the bonds or reclamation plans.

Performance standards, when used as the guidelines for reclamation, must be attained in perpetuity after the mine operation is completed. We feel that this can only be attained by incorporating design criteria into reclamation plans which include performance standards as a target for reclamation standards.

QUESTIONS FOR THE RECORD
SENATOR BUMPERS
GLENN MILLER
HEARING ON
RECLAMATION AND BONDING PRACTICES ASSOCIATED WITH
HARD ROCK MINING ON FEDERAL AND STATE LANDS

1. Does the mining industry use state-of-the-art technologies or practices at every operation?

   o What are the state-of-the-art technologies for preventing acid mine drainage?

   o Are these technologies or practices required in every case where acid mine drainage is a potential problem?

2. What is done today, or can be done today, to prevent an open pit mine from becoming a future Superfund site, like the Berkley pit in Montana?

3. What are the environmental costs and benefits of backfilling large open pits?

4. In your experience does the Bureau of Land Management standard of "no unnecessary or undue degradation", and the Forest Service standard "to minimize adverse environmental impact," as applied by these agencies provide a sufficient amount of environmental protection? Do the statutory standards need to be tightened or their enforcement?

5. Do you think the initiatives that the Bureau of Land Management outlined in its testimony regarding increased inspections, personnel presence and funding will resolve the problems encountered in the the Bureau of Land Management's surface management program?

6. Do you believe phased bonding would be effective in assisting operators in obtaining bonds and in assuring reclamation?

7. I understand that the mining industry would prefer that federal and state reclamation requirements be expressed as "performance standards" rather than "design criteria". How would you characterize the approach taken by the federal and state regulatory programs?

8. Do reclamation experts in the industry, agencies and general public have any organized way to share information regarding reclamation technology? Is there an electronic data bank available on existing technology -- successes and failures -- or are companies and land managers and interested citizens reinventing the wheel every time a new mining project comes up? Can the Federal Government assist in developing a technology transfer computer network?

SIERRA CLUB

Toiyabe Chapter – Nevada and Eastern California

May 2, 1990

Honorable Jeff Bingaman
Chairman, Subcommittee on Mineral
Resources and Development and Production
United States Senate
Washington D.C. 20510

Dear Senator Bingaman,

This letter represents my response to the questions submitted following the hearing on reclamation and bonding practices. But first, I wish to make an additional point in regard to those hearings. BLM Director Cy Jamison indicated that all mining activity would be bonded in the very near future, by policy if possible. The 3809 regulations do not presently give him that authority in regard to mining disturbances of less than 5 acres. In Nevada, these projects end up causing a very great amount of disturbance, particularly for exploration activities (i.e. five miles of a narrow road is less than five acres). It may be appropriate to formally notify the Director that the BLM will need to change the regulations in order to comply with his testimony.

Answers to the questions are given below.

1. In Nevada, one rarely hears the term "state-of-the-art technology" in regard to minimization of mining disturbances. The mining industry bases most of their decisions on "least-cost technology" and the BLM rarely asks for any upgrades. In discussions with the BLM on alternative reclamation techniques, they have indicated that to ask for more expensive technology would be contrary to the 1872 Mining Law and BLM policy. This is particularly a problem on waste dump placement and refilling pits. In the Environmental Assessments, essentially no alternatives are presented other than the one proposed by the mining company, and rarely is the "best-available technology" or "state-of-the-art technology" considered. However, the requirement of FLPMA which requires prevention of "unnecessary or undue degradation" demands the best technologies, since to do less would create unnecessary degradation.

2. Good planning, sound regulations and sufficient regulatory staff will reduce the risk of creation of new Superfund sites. The BLM needs many more people. As of last year, the BLM in Nevada, which has the largest precious metals mining production in the U.S., did not even have a chemist on the State staff. Without a competent chemical staff to review the many chemical issues associated with mining, I feel that the chances of avoiding future superfund sites are not good.

3. Backfilling pits will nearly always have substantial benefits. It will eliminate large depressions in the ground and limit the mounds of rock which came out of the pit. Original contours will be more closely reestablished and the chances for return to the original level of productivity will be enhanced. However, not all pits need to be filled, and the agency should be given discretion to require refilling of pits when the environmental benefits warrant refilling. A major problem with leaving deep pits open in Nevada is that they will partially fill with water and permanently affect the hydrologic systems in the groundwater basin. Although these impacts will not be eliminated by refilling the pits, they will be minimized, since the amount of water collecting in the interstitial areas of the refilled pit will be smaller, and the hydrologic gradients will be reduced. In addition, the creation of stagnant, poor water quality ponds throughout Nevada will affect those areas permanently. The Yerington copper pit is now a useless body of water which is acidic and contains a variety of metals. As many as 200 of these pits may be created in Nevada, and further limit the availability of good water, which is the State's limiting resource. At any

LAS VEGAS GROUP
P.O. Box 19777
Las Vegas, Nevada 89119

To explore, enjoy, and protect the wild places of the earth . . .

GREAT BASIN GROUP
P.O. Box 8096
University Station
Reno, Nevada 89507

rate, a very heavy burden should be placed on the mining company to demonstrate why refilling the pit should not be required, based on a productive post-mine land use.

4. The BLM has a history in Nevada of promoting mining as the first priority, rather than allowing 'no unnecessary or undue degradation' to the land. In my opinion the BLM has, for at least 10 years violated that clause of FLPMA. For example, no EIS has ever been written on any mine on BLM managed public land in Nevada, and bonding is almost non-existent. The reclamation plans are very thin and offer few specific plans on what reclamation will be performed, and have no objective standards for what constitutes reclamation. New legislation is required which clearly establishes reclamation goals for mined lands and protection from degradation. Because of the very political nature of the BLM, this agency, in particular, must be given unambiguous direction for mining regulation. Alternatively, the Forest Service in Nevada is doing reasonably well, under the very severe constraints of the 1872 Mining Law. Even in those cases, however, they are forced to permit mining operations which make no sense economically or environmentally. The Toiyabe Forest may be forced to permit a mine in the heart of the newly created Arc Dome wilderness because of the Mining Law.

5. No, the BLM is fundamentally flawed in its approach to mining regulation, and only new legislation will resolve the problems. For example, the BLM allows the mining company to select the consulting firm to prepare the Environmental Assessments and pay them directly. This blatant conflict of interest has resulted in 100% Findings of No Significant Impact (FONSI's) on all mines in Nevada on BLM land, even those which disturb in excess of 1000 acres and remove over 100 million tons of rock. Those consulting firms which find significant problems with a new mine, and suggest preparation of more thorough environmental documents are unlikely to stay in business. New legislation must require permit preparation fees which will allow the agency to select firms or internal staff who will be responsible to the public, and not the mining company.

6. Bonding can take on a variety of forms. I support use of bonding mechanisms which will ensure that funds will be available to reclaim all of the disturbance. This may not always require cash in the bank, although a majority of the reclamation bond should be readily revokable.

7. If strong, enforceable performance standards can be written, I would agree that they can be used, rather than design criteria. Performance standards assume creative, competent mine reclamation staff and federal mine regulators. In Nevada, I have seen excellent reclamation based on performance standards from good minng companies. However, design criteria provide a clearer prescription for reclamation and have worked well for most of the coal mined land in the West. The best solution is probably to establish a clear set of design criteria with an option for a variance if better options exist for a particular piece of country. I would trust the Forest Service with performance standards, but not the BLM.

8. Reclamation information is being exchanged in Nevada, both by the federal and state agencies, and the industry in a commendable manner. A major need, however, is additional research on arid lands reclamation for hard rock mines. I strongly suggest that additional funds be appropriated through the USDA and DOI to support long-term research in this area. The Land Grant Institutions are in a particularly good position to carry out this research. It would be appropriate to encourage industry-university cooperative research, since the industry has the large equipment and the need for the research, and the universities have the research capability.

Thank-you for the opportunity to respond to the questions.

Sincerely,

Glenn C. Miller

Glenn C. Miller, Ph.D.
Chairman of the Sierra Club Committee on Mining

ARIZONA TOXICS INFORMATION PROJECT

Joni Bosh
2127 E. Osborn
Phoenix AZ 85016
(602) 956-4390

Michael Gregory
Rt. 1 Box 25A
McNeal AZ 85603
(602) 432-7340

2 May 1990

The Honorable Jeff Bingaman, Chairman
Subcommittee on Mineral Resources Development and Production
Committee on Energy and Natural Resources
U.S. Senate
Washington D.C. 20510-6150

Dear Senator Bingaman:

As you requested in your letter of 24 April, enclosed please find my responses to the additional questions relating to the Subcommittee hearing of April 19th.

Thank you for the opportunity to make these additional comments.

Sincerely,

Michael Gregory

RESPONSE OF MICHAEL GREGORY TO
QUESTIONS FOR THE RECORD
SENATOR BUMPERS
HEARING ON
RECLAMATION AND BONDING PRACTICES ASSOCIATED WITH HARD ROCK MINING ON FEDERAL AND STATE LANDS

1. Does the mining industry use state-of-the-art technologies or practices at every operation? o What are the state-of-the-art technologies for preventing acid mine drainage? o Are these technologies or practices required in every case where acid mine drainage is a potential problem?

A. I cannot say what happens "at every operation," but in general I would expect large operations to use more state-of-the-art technology than small, underfunded operations. There is no way of knowing if such practices are required "in every case," since closure plans are not available for all mines, but the existence of so many acid contamination sites indicates that such measures are not always required.

State-of-the-art technologies involve (1) stopping or maintaining discharges while improving water quality; or (2) reducing discharge without taking specific steps to improve quality (i.e., getting better readings through lower volumes of discharge); or (3) minimizing amount and or toxicity of displaced materials. Examples of the first kind of measure would be (a) preventing oxidation through wet containment on a liner; (b) constructing diversions to prevent overland flows into or from mine workings; (c) sealing raises and vents down to solid rock in ore to limit shallow groundwater movement into the mine; (d) capping tailings and dumps; (e) regrading surfaces to eliminate depressions that might hold water; and (f) neutralization with additives (lime, e.g.) or through biological treatment (e.g., in wetlands).

To reduce drainage into the mine system from intercepted groundwater, points of entry must be located and sealed, including drill holes, stopes and drifts and faults and fissures.

Minimization of toxicity in displaced materials might involve separating ore and overburden types into separate storage units depending on degree of protection needed, removing wastes to hazardous waste treatment or similar facilities, etc.

All of these are mitigation measures which require detailed knowledge of mineralogy, hydrology and physical characteristics of the mine site; all of them are fairly expensive. In many cases, where such knowledge is acquired before mining (as it should be), state-of-the-art technology would dictate not mining in the first place.

2. What is done today, or can be done today, to prevent an open pit mine from becoming a future Superfund site, like the Berkley pit in Montana?

A. The prevention of groundwater contamination from open pit mining is highly problematical at best (see answers to questions #3 and #7, below). If, given the many potential adverse impacts, a decision is made to mine, it may be that the best that can be done is to implement, during the excavation process, some of the measures cited in my answer to the previous question. That is, as waters are opened up during the production stage, they should be plugged or diverted to prevent their contamination. Although we are highly skeptical that an open pit can ever be secured against groundwater degradation, if environmental progress reports are made throughout the full mining cycle, and corrective actions taken as problems arise rather than waiting until the closure/post-closure periods, there is a better chance that major contamination problems might be avoided.

3. What are the environmental costs and benefits of backfilling large open pits?

A. As stated in the USDA-Forest Service General Technical Report INT-35 (1977): at a major open pit mine, "500 million tons of ore will be mined, a billion tons or more of overburden will be placed on waste dumps; there will be almost 500 million tons of tailings and 10 to 15 million tons of concentrate will be sent to the smelter, from which 5 million tons of copper will be recovered. The excavation of a billion and a half tons will leave a hole nearly a cubic mile in size. Using presently available mining methods, particularly at mines already partially developed, it is not possible to economically replace the mine and mill wastes and to restore the surface to anything like the original contour."

Backfilling may be economically feasible in some cases, and may be environmentally acceptable, depending on the hyrdology of the site, chemical and physical composition of the backfill material, climate and weather regime, proximity of fill to hole, etc. Besides the immediate problems with dust, noise, etc., backfill may be leached by surface and groundwater movements, thereby discharging highly contaminated leachate to surface or groundwater. Underground systems disrupted when originally intercepted by mine workings will again be interrupted by backfill, with fairly unpredictable effects on area wells, springs, etc. Such environmental issues, which are of concern in small as well as large pits, must be considered in determining potential costs of mining.

4. In your experience, does the Bureau of Land Management standard of "no unnecessary or undue degradation" and the Forest Service standard "to minimize adverse environmental impact," as

applied by these agencies provide a sufficient amount of environmental protection? Do the standards need to be tightened or their enforcement?

A. No. I believe both standards and enforcement need to be tightened, especially for smaller operations. The "unnecessary and undue" standard, seen in the context of other BLM regulations, does not lend itself to an interpretation of mining as a multiple use; rather, "necessity" is seen as necessity for a particular mine or miner, not in terms of national priorities.

5. Do you think the initiatives that the Bureau of Land Management outlined in its testimony regarding increased inspections, personnel presence and funding will resolve the problems encountered in the Bureau of Land Management's surface management program?

A. No, especially not without sufficient budgets to give environmentally-sound mining issues equal footing with all other Bureau concerns. Furthermore, as Mr. Jamieson pointed out, the current regulations call for "reasonable" reclamation and posting of "necessary" financial assurances "when deemed appropriate" by the individual local officer. Given the wide range of experiences, attitudes, expertise, etc. of different BLM officers, terms like "reasonable" "necessary" and "appropriate" in this context become very ambiguous and such ambiguity leads to uncertain protection of non-mining values on the public lands. Without clear Congressional guidelines, I believe the intent of Congress in FLPMA will continue to be frustrated, despite Mr. Jamieson's professed good intentions.

6. Do you believe phased bonding would be effective in assisting operators in obtaining bonds and in assuring reclamation?

Yes, but without policing we will not be much better off than at present. One of the clear dangers to a phased bonding system is the possibility that the public might be excluded from participation at each phase. We believe that public hearings and public review should be a part of decision-making at each phase of the process.

7. Please elaborate on the hydrological effects of flooding an open pit. In particular, please describe the effects of flooding a pit below or above the water table, migration of toxics, etc.

A. I am not technically competent to discuss the many implications of mine flooding or the different impacts of flooding pits above or below water table. In general, although under ideal circumstance flooding may mean no more than a mine filling with water of background ambient quality, more usually flooding will have the potential to significantly affect existing groundwater and surface water quality. As water enters the pit and its associated underground workings, it is likely to become contaminated by leaching the walls of the mine or the dumps and tailings. This de facto leachate may then escape from the mine either through surface drainage and springs or through subsurface fractures, fissures, drifts, etc. Although the dangers are fairly visible in the case of surface drainage, underground discharge into groundwater (due to hydrogeologic complexities, pressures created by the weight of the water itself, honeycombed mine workings, and the fabric of geologic fractures in the underground environment) may not be apparent for fifty or a hundred or more years. In some settings, the situation may be complicated by interbasin connections created by mineworkings, so that flooding may mix waters from one or more aqufers with a variety of potential impacts to supplies of water for drinking, irrigation, and livestock.

Q. Do reclamation experts in the industry, agencies and general public have any organized way to share information regarding reclamation technology? Is there an electronic data bank available on existing technology--successes and failures--or are companies and land managers and interested citizens reinventing the wheel every time a new mining project comes up? Can the Federal Government assist in developing a technology transfer computer network?

A. I am not familiar with such a data bank. Although it would be useful, I believe the government might spend it's money more wisely elsewhere--for instance, in enforcement of existing regulations, in addressing the abandoned mine problem, and in development of waste minimization techniques.

APPENDIX II

Additional Material Submitted for the Record

TECHNICAL INFORMATION PROJECT

POST OFFICE BOX 1371
RAPID CITY, SOUTH DAKOTA 57709

TELEPHONE (605) 343-0439

WRITTEN TESTIMONY FOR THE SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES, SUBCOMMITTEE ON MINERAL RESOURCES DEVELOPMENT AND PRODUCTION, HEARING APRIL 19, 1990

SUBMITTED BY DEB ROGERS, EXECUTIVE DIRECTOR,
TECHNICAL INFORMATION PROJECT

Thank you for this opportunity to comment. Following is a brief outline of environmental concerns associated with modern large-scale surface mining operations located in the Black Hills of western South Dakota.

BACKGROUND

South Dakota currently has five large open pit gold mine operations permitted in the northern Black Hills. These operations received initial permits as follows:

Homestake (Open Cut) - 1982
Wharf Resources - 1982
Brohm Mining Corporation - 1986
Bond Gold - 1988
Golden Reward - 1988

All the operations except for Homestake process their ore using the heap leach method wherein sodium cyanide solution is sprayed onto heaps of crushed ore placed on composite clay/synthetic liner pads outdoors. Homestake's Open Cut ore is processed in a conventional mill associated with their century-old underground gold mine.

Problems experienced since 1982 at these modern, state-of-the-art operations are summarized below.

LEAKING PADS AND PONDS

Cyanide solution and associated metals from the ores have made their way through the liners of pads and ponds at at least two of the operations. The two newer heap leach operations don't have much operating track record yet. One leaking pad was shut down for repairs by state regulators when leachate collected by a system of pipes in the liner exceeded 500 gallons per acre per day. That same operator is now experiencing cyanide in monitoring wells downgradient from the pad, indicating that leachate made its way beneath the leak collection pipes. State regulations do not address rates of leakage specifically, but the regulating agency has an informally-adopted policy of response to leaks which mandates shutdown when leaks exceed 500 gallons per acre of pad per day.

DISPOSAL OF SPENT ORE

Spent ore (ore that is through being leached) is currently being disposed of by dumping into valleys. These valleys or ravines are on the upper ends of spring-fed stream valleys in most cases. Groundwater, springs and streams are at risk when contaminants such as arsenic, nitrates, metals or cyanide leach from the spent ore. The state agency is issuing "groundwater quality variances" and "groundwater discharge permits" which exempt the disposal of this spent ore from state standards on non-degradation of groundwater quality. Spent ore disposal is fairly recent, so no track record has been established.

LAND APPLICATION OF WASTE WATERS

Each of the four heap leach operations has received permission from the state to dispose of waste waters by "land application"-spraying of the waters onto forest lands. Disposal of waste waters becomes necessary periodically when high precipitation fills the procesing solution ponds. Operators have sought state permission for land application rather than the more difficult option of receiving a federal NPDES permit to discharge directly into streams, which could expose them to National Environmental Policy Act requirements. Waste waters contain cyanide, nitrates, sodium, arsenic and heavy metals. Environmental impacts of land application can include groundwater contamination, buildup of elements in the soils and vegetation, and exposure of fish and wildlife to toxins.

SULFIDE ORES AND ACID DRAINAGE

Sulfide ores consist of particular minerals that have the potential to generate sulfuric acid upon exposure to oxygen and water. This leads to the notorious acid mine drainage problem, common in eastern coal mining regions. To date, two of the Black Hills open pit operations have announced that they have sulfide ores beneath existing oxide ores currently being mined. One company has a major proposal to mine sulfides currently pending before the U.S. Forest Service. The other company has not yet announced its intentions. Both operations have the potential to contribute significant amounts of metals-laden acid drainage to streams for an indefinite period of time following mining.

BIRD KILLS AT CYANIDE PONDS

Birds and other wildlife can find the cyanide processing solution ponds at heap leach operations attractive. Direct contact with the solution often kills the animal. South Dakota's four operations have documented over 600 wildlife deaths since 1983. Flagging, netting and other devices to scare away or prevent access by wildlife are now being required by state regulators. The effectiveness of these mechanisms is under review.

STREAM IMPACTS

Each mining operation impacts one or more small streams which are tributaries to the major streams of the northern Black Hills. To date, three streams affected by three separate modern mining operations have experienced visible water quality alterations: Bridal Veil Falls ran red, Annie Creek ran yellow, and Strawberry Creek has whitish deposit coating the stream bed. Burdens of heavy metals, arsenic, radioactivity, cyanide, nitrates, sodium, pH change or other stream quality alterations could result if streams continue to be exposed to mine runoff. State regulations prevent substantial degradation of stream quality, but penalties and enforcement activities are not particularly strong.

USE OF OLD TAILINGS

Old mine wastes from activities of the past 100 years remain scattered throughout the Black Hills. Two present-day operators have used or are planning to use old tailings in their operation. One company used old sulfide tailings in constructing their heap leach pad. They have experienced contamination in their groundwater monitoring wells, and it is unknown if the contamination is simply from their leaking pad, or if the old tailings have contributed to the situation. Another company is planning to reprocess old tailings along Whitewood Creek to extract residual gold. This latter site is a Superfund site for which EPA recently ordered a cleanup of the arsenic-laden tailings. Use and disturbance of old tailings presents a risk of mobilizing arsenic, radioactivity, heavy metals, acidity, or cyanide and its breakdown products, all of which are then available to run into nearby streams or leach into groundwater.

RECLAMATION UNDEFINED

Reclamation is required by state law in South Dakota, but it is poorly defined and enforced. Current state regulations set a reclamation standard of returning the mine site to a condition that is "visually and functionally compatible" with the surrounding landscape. This is implemented by having a state permitting board approve or disapprove a reclamation plan submitted by the mine operator. To date no plan has been disapproved. A loophole in the regulation then exempts an operator from even this vague standard if the reclamation would be financially infeasible. All operators seeking permits since the regulations were implemented have claimed this exemption. The net result is that all large-scale open pit mines permitted in the Black Hills plan to leave pits and waste dumps substantially in place, with only minor landscaping, distribution of topsoil, and revegetation on the surface of features that are not too steep.

BONDS LIMITED

Current state law in South Dakota requires that mine operators post a reclamation bond. This bond is calculated by the state regulatory agency to cover the cost of reclaiming the site as proposed by the operator. No money is included to effect a more comprehensive reclamation, nor to remediate any potential contamination of the soils, groundwater or streams caused by catastrophic spills or long-term leaching of mine wastes. A new proposal to establish an environmental remediation bond is currently in a state rulemaking procedure. The bond would be imposed solely at the discretion of the permitting board, and its calculation is not very clearly defined.

SUMMARY

The State of South Dakota is not regulating large-scale surface mine operations in such a manner as to minimize environmental impacts or maximize financial and environmental protections. There is much room for improvement if a regulatory approach is to be followed. An alternative approach would be to impose a strict liability standard, and to require full liability coverage by operators. This could provide a financial incentive for operations to be run in an environmentally responsible manner.

- - - - - - - - - - - - - -

EC

OFFICIAL COMMITTEE FILE
PLEASE RETURN

MR

LAW OFFICES OF
ROBERT A. SANREGRET
316 WEST 4TH STREET, SECOND FLOOR
SANTA ANA, CALIFORNIA 92701

ROBERT A. SANREGRET
OF COUNSEL
TEMPLETON (TONY) BRIGGS
LANCE A. BREWER

(714) 547-8451
FAX (714) 550-0668

1990 MAY 10 PM 4 13

MAY 14 1990
WASHINGTON, D.C. 2051

May 7, 1990

The Honorable Bennett Johnston
136 Hart Senate Office Building
Washington, D.C. 20510

Re: WMC and NAMD Opposition to S.1126 ("Mining Law of 1989"), and Opposition to Restrictions on Mineral Prospecting

Dear Senator Johnston:

On behalf of the Western Mining Council (WMC) and the National Association of Mining Districts (NAMD), I would like to express our opposition to S.1126, and particularly our opposition to the restrictions and fees proposed on mineral prospectors and small miners.

The WMC and NAMD represent the many U.S. citizens who regularly explore for minerals on Western U.S. Public Lands, under the access provisions of the present U.S. Mining Law. This exploration and mineral prospecting does no damage to the environment, and results in the identification and "inventorying" of mineral deposits in the Western U.S., at no cost to the public. The present U.S. Mining Law has been aptly referred to as the world's premiere example of an efficient free enterprise incentive system, resulting in an efficient inventory of our mineral reserves.

The U.S. needs continued mineral exploration and development, particularly since we have already "exported" thousands of mineral industry jobs and businesses to China, Australia, Africa and elsewhere. Today we are paying increased prices to foreign suppliers of many mineral commodities which are readily available on our Western U.S. Public Lands (including talc, mercury, iron ore, wollastonite, precious metals, rare earths and other minerals.)

WMC and NAMD support reasonable regulation and environmental controls. However, the non-destructive access to Public Lands by mineral prospectors has greatly decreased due to the over-regulation resulting from bureaucratic "turf wars" for control of Public Lands, and from political pressure from some misguided environmental extremists who advocate stopping and reversing all development to "live simpler without development". We certainly do not deny the right of any person to "live simpler". However, if the entire U.S. were to "live simpler" without business or mineral development, the productivity decreases would reduce our standard of living, reduce our national strength, and would make the U.S. subservient to foreign powers and to foreign mineral sources for many strategic, critical and other minerals.

The Soviet Union has three times the mineral reserves of the U.S., but for the last 70 years Soviet "Geological Technicians" (i.e., mineral prospectors) had minimal incentive or motivation to identify and "inventory" their minerals--because the transfer of a Soviet Geological Technician from Moscow to Siberia was never considered a promotion or a desirable assignment. However, with the Soviets reportedly now offering financial incentives to their Geological Technicians for the discovery and identification of minerals, we will likely see the Soviets "bury us" economically by their control of world mineral sources and supplies. The U.S. must continue its existing effective mineral identification and inventorying system under the present U.S. Mining Law.

Enclosed find the Testimony/Statement of WMC submitted for the April 19, 1990, Subcommittee Hearing on S.1126. The WMC and NAMD will be happy to provide you with additional data and information on this matter.

Would you please keep me specifically informed of any Subcommittee activity relative to S.1126.

Very truly yours,

ROBERT A. SANREGRET
For: Western Mining Council, Inc. (WMC); and
National Association of Mining Districts (NAMD)

RAS/sw

Encl.

cc: The Honorable Alan Cranston
112 Hart Senate Office Building
Washington, D.C. 20510

The Honorable Pete Wilson
720 Hart Senate Office Building
Washington, D.C. 20510

(NON-PROFIT ORGANIZATION)

WESTERN MINING COUNCIL, Inc.

To The United States Senate
Subcommittee on Mineral Resources Production and Development,
of the
Committee on Energy and Natural Resources
Hon. Jeff Bingaman, Chairman

Bonding and Reclamation Requirements Relative to the U.S.
Mining Law, the Proposed "Mining Law of 1989" (S.1126),
and Related Bills

Presented by:
Robert A. Sanregret, A.B., M.B.A., J.D.
Representative of the Western Mining Council, Inc.

Washington, D.C.
Date: April 19, 1990

Mr. Chairman and Members of the Subcommittee:

Thank you for allowing the Western Mining Council to present its views on the matter of bonding and reclamation requirements relative to the proposed "Mining Law of 1989" (S.1126) and related bills.

I. INTRODUCTION.

The Western Mining Council is a group of independent miners and prospectors, including individuals, small companies and many owner-operators, active throughout the Western United States. Most major mines and major mineral discoveries in the Western U.S. were discovered by small miners and individual mineral prospectors. New restrictive bonding and reclamation requirements should not apply to mineral prospectors, because to do so would devastate the individual and small company mineral prospectors now active on Western U.S. public land. These private citizens effectively locate, identify and "inventory" minerals on the Western U.S. public lands, at no cost to the public. The large mining companies readily acknowledge that individual mineral prospectors and small miners are essential to the effective continuing identification and inventorying of minerals and mineral deposits in the United States. The application of bonding and reclamation requirements to individual and small mineral prospecting entities would impede the prospecting process, and would effectively prohibit mineral prospecting on Western U.S. public land by individuals or by small companies.

II. THE U.S. RELIES UPON SMALL PRIVATE MINERAL PROSPECTORS TO LOCATE, IDENTIFY AND "INVENTORY" MINERALS ON WESTERN U.S. PUBLIC LAND.

There are hundreds of substantial mining operations in the U.S. upon which private citizen prospectors made the initial mineral discoveries. The incentive for these citizen-prospectors was and is the U.S. Mining Law, which provides an opportunity for U.S. citizens to enter public domain land and to prospect for minerals, without damaging or degrading the land.

The major U.S. mining companies have repeatedly stated that they need the individual mineral prospector, and that approximately 70% of their mines have come from discoveries by individual prospectors exploring for minerals under the U.S. Mining Law.

The California Chamber of Commerce stated in June 1989 that: "Mining corporations would be crippled without the aid of the individual prospectors to help in the location and identification of future mineral deposits."

In June 1989 the American Mining Congress said that: "The contribution of the small miner to the search for new mineral wealth is substantial, [and]...both the executive and legislative branches of government must assure the small miners' continued access to public lands to search for, develop and produce new mineral wealth without the fear that he will be unable to enjoy the fruits of his labors."

Private citizens explore for minerals on the Western U.S. public lands today, without degrading the environment. Any development of a mine, of course, requires an approved permit and plan of operation. The exploration and development equipment today is vastly superior to that of 10 to 50 years ago. Today's efficient methods and equipment enable mineral prospectors to locate previously hidden or unknown mineral deposits. Also, today's more efficient processing and development methods make some previously uneconomic low-grade deposits commercially feasible today.

The mineral discoveries by individual prospectors provide an efficient low-cost identification and inventorying of minerals in the vast Western U.S. public lands. For example, it has been recently reported that private citizen prospectors have discovered commercial deposits of chromium, manganese and platinum, which, if true, would help eliminate our dependency upon foreign sources for chromium and other critical and strategic minerals.

It is estimated that 70% to 80% of the hundreds of large mines and mineral discoveries in the U.S. were discovered by an individual private prospector. These mineral deposits were discovered by people who were looking in areas not known to contain commercially valuable mineral deposits. Several major California mines which were discovered by individual mineral prospectors, including Molycorp's "Mountain Pass Mine" a major source of rare earths), Gold Fields Mining Corp's "Mesquite Mine" ($80+million annual gold production), and U.S. Borax Corp.'s "Boron Mine" (60% of the free world's borates).

Mineral prospecting o. U.S. public land under the U.S. Mining Law provides incentives in that if a citizen-prospector finds a mineral deposit, that citizen may develop a mine, at no cost to the public. There is no "subsidy payment" for not prospecting, nor is there payment for not producing. Obviously only a small percentage of mining exploration prospects result in profitable mines. However, the successful prospector's reward for making a valuable mineral discovery is the prospector's assurance under the U.S. Mining Law that he may develop the mineral deposit. The three major California mines mentioned above, and many others elsewhere, would never have been discovered the individual prospectors and developed by anyone without the incentives under the Mining Law. There are thousands of persons today who regularly go out prospecting for minerals on the U.S. public lands, and who should be encouraged to continue doing so.

III. CONCLUSION.

The present method of mineral prospecting works efficiently to identify and "inventory" minerals on Western U.S. public lands, at no cost to the public. The valuable U.S. resource of utilizing the self-initiation and incentive of private U.S. mineral prospectors in the Western U.S., at no cost to the public, would be devastated by the creation of burdensome "preconditions" under bonding and reclamation plans which would restricted individual mineral prospecting. As has been said before relative to the present U.S. Mining Law, but which is particularly appropriate: "If it ain't broke, don't fix it."

Thank you for allowing the Western Mining Council to present its views in opposition to the application of new bonding and reclamation restrictions to individual and small company mineral prospectors.

ROBERT A. SANREGRET
Western Mining Council, Inc.
316 West 4th Street, Second Floor
Santa Ana, CA 92701
(714) 547-8451

Greater Yellowstone Coalition

Senator Dale Bumpers
220 SDOB
Washington D.C. 20510

May 3, 1990

Re: S1126

Dear Senator Bumpers:

Please consider this testimony as part of the hearing record on S1126, "Mining Law of 1989". We understand that your recent hearing on this bill was focused upon reclamation, and it is to this section these comments will be addressed.

The Greater Yellowstone Coalition is dedicated to the preservation of the 13 million acre ecosystem that includes Yellowstone and Grand Teton National Parks and all or substantial parts of 7 national forests in addition to land and resources managed by a variety of other public agencies and private owners. Outside of National Park and Wilderness Area withdrawals, over half of the remaining lands are open for mineral entry or have had mineral rights claimed. Much of this area could contain the hardrock minerals for which this bill is intended. Many areas have already seen mining activity which stands as testimony to the need for the legislation you propose. Exploration applications flow into agency offices each month, while full scale development is occurring at several significant mine sites and production is underway at several others. We are compiling an inventory of mining activity in the Greater Yellowstone Ecosystem (GYE) that we will present for the record at an appropriate time.

Past mining activities have impacted valued portions of the Ecosystem to the point of irreparable harm. Denuded ground, waste dumps, old tailings impoundments (which used to be known as slime pits), acid mine drainage and just plain industrial trash and scrap can be found in varying degrees in dozens of drainages and mountain-sides in the GYE. Present developments of a scale that is vast in comparison with past mining efforts are becoming more common as the price of gold and other metals climb. A clash of values is emerging as population pressure and habitat reduction affect wildlife, water quality and recreational opportunities.

In the decision making path lie a number of factors that will dictate future mineral policy. The "right to mine" 1872 law and its subsequent rules, along with agency management directives offer insufficient protections to resource values. Perhaps no single region has more resource conflict than here in the Greater Yellowstone.

This is not to say that there are no specific sites with mineral value that can be mined, or remined, in the region, but many such locations require an extrordinary investment of money, technical skill and luck to restore them to the standards that will return them to a productive segment of the Ecosystem. *The commercial value of the mineral resource must be weighed against all costs of mining, including reclamation, before a valuable deposit determination can be made.* [Sec 203(c)(1)] Furthermore, in accordance with Sec. 301(b), the standard of restoration "...of the land to a condition capable of supporting the uses which it was capable of supporting prior to any mining", should be expanded to include the following language: *"..return to approximate original contour, including roads, unless deviation from "AOC" will provide equal or superior capability results, or would result in further degradation of the environment."* and *"...that such reclamation will include as uses, those biologic habitat considerations that are found in both terrestrial and aquatic environments."*

In summary, it should be clear in the legislation that: 1. the valuable deposit test include reclamation costs, 2. that approximate original contour be required with exceptions, and 3. that terrestrial and aquatic environment restoration be specified.

Sincerely,

Don Bachman

Don Bachman
Greater Yellowstone Coalition

cc. Senator Max Baucus

ARIZONA
MINING ASSOCIATION

DAVID C. RIDINGER
President

May 31, 1990

The Honorable Jeff Bingaman, Chairman
Subcommittee on Mineral Resources
Development and Production
Senate Energy and Natural Resources Committee
362 Dirksen Senate Office Building
Washington, DC 20510

Attention: Ms. Lisa Vehmas
Professional Staff Member

Dear Senator Bingaman:

This letter is written on behalf of the Arizona Mining Association and its member companies. On April 19, 1990 the Subcommittee on Mineral Resources Development and Production of the Senate Energy and Natural Resources Committee conducted an oversight hearing on reclamation and bonding practices associated with hard rock mining on Federal and state lands.

One of the witnesses appearing before the Subcommittee was Mr. Michael Gregory, testifying on behalf of the "Arizona Toxic Information Project." The purpose of this letter is to clarify, for the record, several assertions contained in Mr. Gregory's statement which, we believe, to be replete with errors and omissions of pertinent facts.

Arizona has one of the most progressive and comprehensive laws in the nation for protecting water quality. In fact, the U.S. Environmental Protection Agency's "Survey of State Groundwater Quality Protection Legislation Enacted from 1985 through 1987" sets forth: "Arizona's 1986 Environmental Quality Act (Chapter 368) perhaps comes closest to incorporating the full range of policy options into a single groundwater protection strategy." The Arizona Environmental Quality Act of 1986 specifically includes mining operations. Mining operations that were active as of January 1, 1988, and new mining operations as well, are required to obtain "aquifer protection permits" which require controls on surface and subsurface discharges to ensure that virtually all aquifers meet aquifer water quality standards, which are equivalent to federal primary drinking water standards. In addition to protecting the water quality standards, discharges must be controlled through the use of Best Available Demonstrated Control Technology (BADCT).

Permit applications typically require hydrogeologic studies and disposal impact assessments. Permit conditions include monitoring requirements, contingency plan requirements, corrective action for past releases and post-closure plans. Permits may be denied if the agency determines that the applicant is not financially competent to carry out all of the requirements of the permit program. Consequently, this program, especially in conjunction with other existing Arizona regulatory programs, represents the functional equivalent of a complete mine reclamation program.

In addition to the regulation of active mining operations under the aquifer protection permit program, Arizona also addresses active and inactive mining operations through the Environmental Quality Act's "Water Quality Assurance Revolving Fund" provisions, the equivalent of a state "Superfund."

The two examples Mr. Gregory referenced to in his testimony as examples of problems due to the alleged lack of mining regulation are, indeed, examples of the Arizona Environmental Quality Act at work. The Copper Queen Mine at Bisbee is a largely inactive facility where mining ceased in 1976. Since then, only small leaching operations have continued. Nevertheless, Phelps Dodge Corporation and the Arizona Department of Environmental Quality are conducting a thorough hydrogeologic study of the historical mining operations that began in the late 1800's in order to evaluate this area for permitting under the aquifer protection permit program. Similarly, the Bitter Creek site below Phelps Dodge's United Verde Mine, where operations ceased in 1953, has been designated for study and is being evaluated under the Water Quality Assurance Revolving Fund program. Controls were installed several years ago by Phelps Dodge which protect Bitter Creek to the satisfaction of the U.S. Environmental Protection Agency pursuant to the federal Clean Water Act.

As you can see, Arizona's progressive environmental laws address even historic mining operations that were conducted during times when environmental laws and regulations such as those outlined above were not prevalent.

Arizona's functional equivalent of a mine reclamation law, including the Arizona Environmental Quality Act, will ensure appropriate environmental controls for ongoing and new mining operations well into the future.

We respectfully request that this letter be included in the record of the April 19, 1990 hearing.

Sincerely,

David C. Ridinger

DCR/jc

pc: The Honorable Dale Bumpers, Chairman, Subcommittee on Public Lands, National Parks & Forests, 308 Dirksen Senate Office Building, Washington, DC 20510

The Honorable Conrad Burns, U.S. Senate, 825A Hart Senate Office Building, Washington, DC 20510

○